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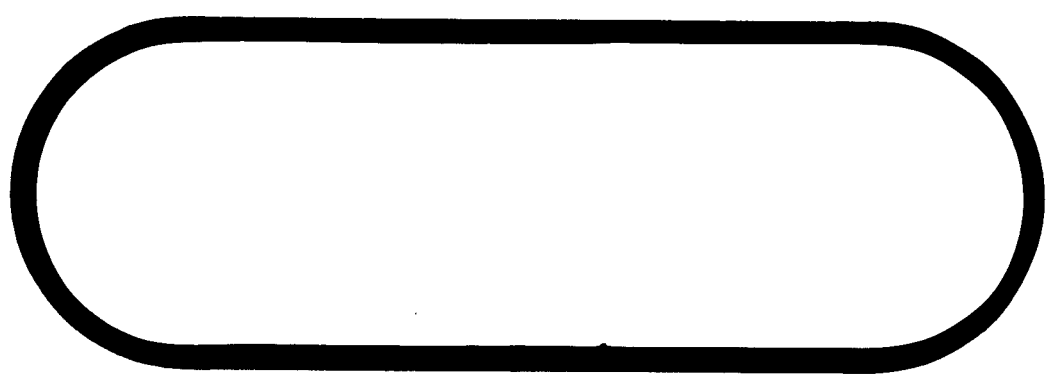
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THE **BOEING** COMPANY

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NUMBER D2-13956-2

TITLE STATISTICAL MEANS AND DISPERSIONS FOR THE MASS PROPERTIES
OF BOEING COMPONENTS FOR THE WING II OPERATIONAL MINUTEMAN
MISSILE -- June 1, 1963

MODEL NO. WS-133 CONTRACT NO. AF04(694)-46

ISSUE NO. 17 ISSUED TO ADJG

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SUMMARY

This report presents statistical means and dispersions for the mass properties of the Boeing components of the Operational Minuteman missile. The data are based upon a statistical analysis of the hardware being produced for the Wing II Operational missiles.

1.0 INTRODUCTION

1.1 REFERENCES

- 1.1.1 BSD Exhibit 62-45, "Mass Properties Control Data for WS-133A Operational Guided Missiles/Systems," Dated 3 August 1962.
- 1.1.2 CCN 258, (BSD-63MSN-2597) to AFO4(647)-580 dated 5 October 1962.
- 1.1.3 Boeing Document D2-13946-xxx, "Flight Article Mass Properties Report for Missile xxx Components."
- 1.1.4 Boeing Document D2-13943-2 "Flight Article Mass Properties Report for Wing II CTLI Installations."
- 1.1.5 Boeing Document D2-13957-4 "Statistical Means and Dispersions for the Mass Properties of Boeing Components for the Wing I Operational Minuteman Missile - June 1, 1963.

1.2 DISCUSSION

This report of statistical means and dispersions for the mass properties of the Boeing components of the Operational Wing II Minuteman missiles is presented in accordance with Reference 1.1.1 as authorized by Reference 1.1.2. The data are based upon the mass properties found in the document of References 1.1.3 and 1.1.4. For a similar report on the Wing I missiles, see Reference 1.1.5.

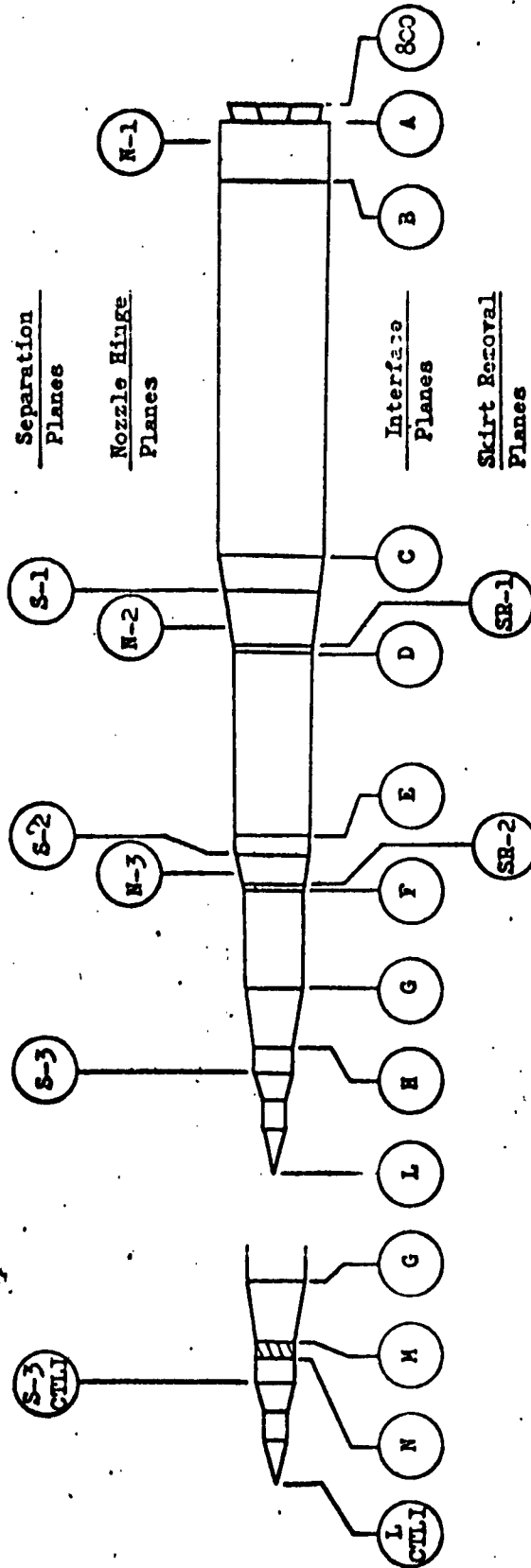
The statistical analysis contained in this report is based upon data available to May 1, 1963 for the Operational Wing II missiles. The data are presented in four sections; (1) flight sequential summaries, (2) statistical means and dispersions data calculations (3) CTLI installation means and dispersions data, and (4) data samples for the interstages, aft skirt, base heat deflectors, raceway covers and caps, and miscellaneous minor components.

All dispersion computations found in this report are based upon a population of .990 and a confidence level of 90% in accordance with directions received from STL on 30 January 1963.

1.3 MISSILE STATION DIAGRAM

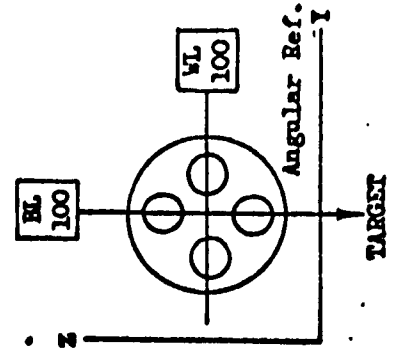
See page 7 for a station diagram showing both missile and section stations.

**WING II
OPERATIONAL AND CTLI MISSILE STATION DIAGRAM**



▷ These Missile Stations become 50.000 when converted to Boeing Section Stations.

SEPARATION PLANES	MISSILE STA	INTERFACE PLANES	MISSILE STA
S-1	501.66	A	784.24
S-2	342.93	B	748.24
S-3	210.55	C	525.60
S-3 CTLI	200.53	D	466.52
		E	357.58
		F	319.23
SKIRT REMOVAL PLANES		G	257.45
SR-1	466.97	H	225.95
SR-2	319.74	L	129.48
NOZZLE HINGE PLANES			
N-1	770.03	M	225.95
N-2	477.32	N	215.95
N-3	327.33	L CTLI	119.46



Reference
STL Release 9862.6-513
(17 December 1962)

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FLIGHT SEQUENTIAL MASS DATA SUMMARY

The following page presents a flight sequential data summary of all Boeing airborne components excluding the CTII installation which is presented in Section 4.0. Sequential summaries by production section are also included as additional reference data.

The data are in sequential form showing mean values for weight, three plane balance, and moments of inertia. Dispersions about these means are included for weight and three plane balance. However, the dispersions given for sequential conditions other than "Prelaunch" are based upon calculations since actual data to verify these points are not available. The ablation amounts are those which STL has directed to be used and are identical to the ablation amounts found in D2-3940-25 "Monthly Status Report, 23 February 1963" as revised in March 1963. The skirt jettison times are separation plus 20 seconds + 4 seconds (Stage II) and separation plus 500 milliseconds + 200 milliseconds (Stage III).

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MISSILE WING II OPERATIONAL															SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)															COMPONENT TOTAL BOEING RESPONSIBILITY														
STAGE		FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²																																
				NOM.	DISP.	LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW																														
LINE						NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.																					
1	I	Pre-Launch	0	952.17	8.86	552.73	1.82	101.17	0.19	102.61	0.21	149.1	584.7	5846.5																														
2			25	903.31	9.13	547.25	2.01	101.13	0.20	102.59	0.23	139.3	5462.4	5454.8																														
3			50	886.66	9.30	544.70	2.12	101.12	0.20	102.58	0.23	136.6	5316.6	5309.7																														
4			75	869.98	9.59	542.05	2.26	101.11	0.21	102.58	0.24	133.9	5170.9	5164.5																														
5		End Action Time	100	853.32	10.01	539.30	2.46	101.10	0.21	102.59	0.25	131.2	5025.1	5019.4																														
6																																												
7	II	Start Action Time	0	457.53	11.13	418.04	2.19	100.31	0.54	102.49	0.57	48.6	587.5	586.5																														
8			25	452.38	11.14	417.29	2.23	100.30	0.55	102.47	0.57	48.0	580.5	579.5																														
9		Skirt Jettison	33.6	251.68	3.71	362.69	1.56	101.56	0.24	103.62	0.28	19.6	201.6	200.5																														
10			50	251.03	3.71	362.49	1.57	101.55	0.24	103.61	0.28	19.6	198.8	197.7																														
11			75	249.83	3.64	361.90	1.52	101.52	0.23	103.58	0.27	19.5	194.6	193.5																														
12		End Action Time	100	248.58	3.73	361.27	1.59	101.49	0.24	103.55	0.28	19.5	190.3	189.2																														
13																																												
14	III	Start Action Time	0	133.13	4.73	325.39	0.71	100.89	0.50	102.67	0.54	10.2	12.2	11.8																														
15		Skirt Jettison	1	45.69	2.18	314.63	2.22	104.45	0.67	106.39	0.84	2.1	5.5	5.2																														
16			25	44.97	1.93	314.43	1.31	104.42	0.62	106.36	0.80	2.1	5.5	5.2																														
17			50	44.22	1.93	314.21	1.33	104.37	0.63	106.33	0.82	2.0	5.4	5.2																														
18			75	43.47	1.94	313.98	1.36	104.33	0.65	106.30	0.83	1.9	5.4	5.1																														
19		End Action Time	100	42.71	1.96	313.74	1.39	104.28	0.66	106.27	0.86	1.8	5.3	5.1																														
20																																												
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																																												
21	I	Silo Heat Protection		32.2		639.3		101.8		103.1																																		
22		Base Heat Protection		45.4		769.2		101.5		102.5																																		
23		Aero Heat Protection		21.2		498.5		102.2		103.8																																		
24	II	Aft Interstage 1-2		122.59		513.1		100.78		99.69																																		
25		Jettisoned Fwd Interstage 1-2		199.05		69.10		98.62		101.49																																		
26		Base Heat Protection		10.3		485.0		103.9		105.1																																		
27																																												
28	III	Aft Interstage 2-3		61.04		349.81		99.27		101.43																																		
29		Jettisoned Fwd Interstage 2-3		87.44		331.02		99.02		100.72																																		
30		Base Heat Protection		3.0		827.4		107.0		108.1																																		
31																																												

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2.2 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																			
MISSILE WING II OPERATIONAL										COMPONENT SECTION 42 (GUIDANCE SECTION)									
LINE	STAGE	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²							
				NOM.	DISP.	LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW					
						NOM.	DISP.	NOM.	DISP.	NOM.	DISP.								
1	I	Pre-Launch	0	1.02	.1	80.9	0	100.0	0	100.0	0	.1	0	0					
2			25																
3			50																
4			75																
5		End Action Time	100																
6																			
7	II	Start Action Time	0																
8			25																
9		Skirt Jettison																	
10			50																
11			75																
12		End Action Time	100																
13																			
14	III	Start Action Time	0																
15		Skirt Jettison																	
16			25																
17			50																
18			75																
19		End Action Time	100	1.20	.1	80.9	0	100.0	0	100.0	0	.1	0	0					
20																			
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																			
21	I	Silo Heat Protection																	
22		Base Heat Protection																	
23																			
24	II	Aft Interstage 1-2																	
25		Jettisoned Fwd Interstage 1-2																	
26		Base Heat Protection																	
27																			
28	III	Aft Interstage 2-3																	
29		Jettisoned Fwd Interstage 2-3																	
30		Base Heat Protection																	
31																			

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SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																			
MISSILE WING II OPERATIONAL										COMPONENT SECTION 44 (STAGE 3 MOTOR)									
S L I N E		FLIGHT SEQUENCE	% EXP	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²							
			WT	NOM.	DISP.	LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW					
						NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	NOM.	NOM.					
1	I	Pre-Launch	0	18.64	1.13	97.86	1.64	106.04	.39	110.67	.76	.3	3.3	3.2					
2			25	18.01	1.13	97.96	1.69	105.89	.41	110.43	.80		3.2	3.1					
3			50	17.81	1.13	97.99	1.71	105.84	.42	110.35	.81		3.2	3.1					
4			75	17.61	1.14	98.03	1.73	105.79	.43	110.26	.83		3.2	3.1					
5		End Action Time	100	17.41	1	98.06	1.75	105.74	1	110.18	.84		3.1	3.0					
6				1															
7	II	Start Action Time	0																
8			25																
9		Skirt Jettison																	
10			50																
11			75																
12		End Action Time	100																
13																			
14	III	Start Action Time	0																
15		Skirt Jettison		17.41		98.06	1.75	105.74		110.18	.84								
16			25	17.36		97.97	1.76	105.76		110.21	.85								
17			50	17.31		97.87	1.76	105.77	.43	110.24	.85								
18			75	17.26		97.78	1.77	105.79	.44	110.27	.85								
19		End Action Time	100	17.21	1.14	97.68	1.77	105.81	.44	110.30	.85	.3	3.1	3.0					
20																			
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																			
21	I	Silo Heat Protection		.40	0	95.00	0	110.30	0	117.70	0								
22		Base Heat Protection																	
23		Aero Heat Protection		.80	.10	95.00	0	110.30	0	117.70	0								
24	II	Aft Interstage 1-2																	
25		Jettisoned Fwd Interstage 1-2																	
26		Base Heat Protection																	
27																			
28	III	Aft Interstage 2-3																	
29		Jettisoned Fwd Interstage 2-3																	
30		Base Heat Protection		.20	0	131.00	0	100.00	0	100.00	0								
31																			

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COMPONENT SECTION 45 (INTERSTAGE 2-3)

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COMPONENT SECTION 45 (INTERSTAGE 2-3)

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EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME

[illegible]

2-5 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																			
MISSILE WING II OPERATIONAL																			
COMPONENT SECTION 46 (STAGE 2 MOTOR)																			
LINE	STAGE	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²							
				NOM.	DISP.	LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW					
						NOM.	DISP.	NOM.	DISP.	NOM.	DISP.				NOM.	DISP.			
1	I	Pre-Launch	0	32.90	1.92	146.61	3.03	105.98	.44	110.42	.77	1.0	18.7	18.3					
2			25	32.14		147.72	3.15	105.83	.46	110.17	.80		18.4	18.0					
3			50	32.01		147.92	3.17	105.81	.46	110.12	.81		18.3	17.9					
4			75	31.87		148.13	3.20	105.76	.47	110.07	.81		18.2	17.8					
5		End Action Time	100	31.74		148.33	3.22	105.75	.47	110.03	.82		18.1	17.7					
6																			
7	II	Start Action Time	0	31.74		148.33	3.22	105.75	.47	110.03	.82		18.1	17.7					
8			25	31.29		147.74	3.24	105.83	.47	110.17	.83		17.9	17.4					
9		Skirt Jettison		31.14	1.92	147.54	3.25	105.86	.47	110.22	.83	1.0	17.8	17.3					
10			50	30.84	1.93	147.14	3.27	105.92	.48	110.32	.83	.9	17.6	17.2					
11			75	30.39	1.93	146.51	3.29	106.01	.48	110.47	.84	.9	17.3	17.0					
12		End Action Time	100	29.94	1.94	145.87	3.32	106.10	.49	110.63	.85	.9	17.0	16.7					
13																			
14	III	Start Action Time	0																
15		Skirt Jettison																	
16			25																
17			50																
18			75																
19		End Action Time	100																
20																			
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																			
21	I	Silo Heat Protection		.60	.10	99.60	0	112.30	0	121.20	0								
22		Base Heat Protection																	
23		Aero Heat Protection		.50	.10	99.60	0	112.30	0	121.20	0								
24	II	Aft Interstage 1-2																	
25		Jettisoned Fwd Interstage 1-2																	
26		Base Heat Protection		1.80	.20	189.20	0	100.00	0	100.00	0								
27																			
28	III	Aft Interstage 2-3																	
29		Jettisoned Fwd Interstage 2-3																	
30		Base Heat Protection																	
31																			

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SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)

MISSILE WING II OPERATIONAL

COMPONENT SECTION 47 (INTERSTAGE 1-2)

S L I N E	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²		
			NOM.	DISP.	LONG. (X)	LAT. (Y)	VERT. (Z)	ROLL	PITCH	YAW			
1	I Pre-Launch	0	372.76	6.02	77.62	99.98	100.94	57.8	NOM.	NOM.			
2		25	362.44	6.05	77.58	99.97	100.95	56.2	50.3	49.8			
3		50	359.70	6.06	77.59	99.96	100.94	55.8	49.9	49.4			
4		75	356.95	6.08	77.60	99.96	100.94	55.3	49.5	49.0			
5	End Action Time	100	354.21	6.10	77.61	99.95	100.94	54.9	49.1	48.6			
7	II Start Action Time	0	231.62	10.63	67.57	99.51	101.60	30.9	20.9	21.0			
8		25	226.92	10.64	67.59	99.46	101.57	30.3	20.5	20.6			
9	Skirt Jettison		26.37	1.70	56.35	105.21	105.71	1.9	1.3	1.2			
10		50	26.02	1.70	56.25	105.11	105.58	1.9	1.3	1.2			
11		75	25.27	1.54	56.01	104.90	105.28	1.8	1.3	1.2			
12	End Action Time	100	24.47	1.72	55.75	104.65	104.95	1.8	1.2	1.2			
13													
14	III Start Action Time	0											
15	Skirt Jettison												
16		25											
17		50											
18		75											
19	End Action Time	100											
20													
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME													
21	I Silo Heat Protection		7.6	.8	80.0	100.3	100.6	0					
22	Base Heat Protection												
23	Aero Heat Protection		11.00	1.10	76.50	100.70	101.20	0					
24	II Aft Interstage 1-2		122.59	6.13	96.58	100.78	99.69						
25	Jettisoned Fwd Interstage 1-2		199.05	9.95	69.10	98.62	101.49						
26	Base Heat Protection		8.50	.90	66.00	104.70	106.10	0					
27													
28	III Aft Interstage 2-3												
29	Jettisoned Fwd Interstage 2-3												
30	Base Heat Protection												
31													

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2.7		SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)														COMPONENT SECTION 48 (STAGE 1 MOTOR)			
MISSILE WING II OPERATIONAL																			
L I N E	S T A G E	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA							
				NOM.	DISP.	LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW					
						NOM.	DISP.	NOM.	DISP.	NOM.	DISP.				NOM.	DISP.			
1	I	Pre-Launch	0	60.86	2.62	228.91	5.45	109.86	.57	116.66	.97								
2			25	56.51	2.64	229.60	5.90	109.94	.61	116.76	1.05								
3			50	55.05	2.65	228.30	6.04	110.12	.63	117.06	1.07								
4			75	53.59	2.67	226.93	6.23	110.31	.65	117.38	1.11								
5		End Action Time	100	52.13	2.69	225.48	6.42	110.51	.68	117.72	1.15								
6																			
7	II	Start Action Time	0																
8			25																
9		Skirt Jettison																	
10			50																
11			75																
12		End Action Time	100																
13																			
14	III	Start Action Time	0																
15		Skirt Jettison																	
16			25																
17			50																
18			75																
19		End Action Time	100																
20																			
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																			
21	I	Silo Heat Protection		2.90	.30	190.40	0	111.80	0	120.40	0								
22		Base Heat Protection		4.80	.50	209.40	0	100.00	0	100.00									
23				1.00	.10	136.60	0	117.20		129.70									
24	II	Aft Interstage 1-2																	
25		Jettisoned Fwd Interstage 1-2																	
26		Base Heat Protection																	
27																			
28	III	Aft Interstage 2-3																	
29		Jettisoned Fwd Interstage 2-3																	
30		Base Heat Protection																	
31																			

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2.8 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)															
MISSILE WING II OPERATIONAL															
COMPONENT SECTION 49 (AFT SKIRT)															
LINE	STAGE	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY				MOMENT OF INERTIA SLUG FEET ²					
				NOM.	DISP.	LONG. (X)	LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW		
1	I	Pre-Launch	0	282.57	4.97	68.48	.27	100.82	.33	101.09	.32				
2			25	254.02	5.38	68.49	.30	100.81	.37	101.05	.36				
3			50	243.04	5.66	68.46	.31	100.78	.39	100.98	.37				
4			75	232.05	6.09	68.44	.33	100.74	.40	100.90	.39				
5		End Action Time	100	221.07	6.70	68.41	.34	100.69	.43	100.82	.42				
6															
7	II	Start Action Time	0												
8			25												
9		Skirt Jettison													
10			50												
11			75												
12		End Action Time	100												
13															
14	III	Start Action Time	0												
15		Skirt Jettison													
16			25												
17			50												
18			75												
19		End Action Time	100												
20															
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME															
21	I	Silo Heat Protection													
22		Base Heat Protection													
23															
24	II	Aft Interstage 1-2													
25		Jettisoned Fwd Interstage 1-2													
26		Base Heat Protection													
27															
28	III	Aft Interstage 2-3													
29		Jettisoned Fwd Interstage 2-3													
30		Base Heat Protection													
31															

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MEANS AND DISPERSIONS DATA CALCULATIONS

The data summarized on the following pages were accumulated during the manufacture of components for the Wing II Operational missiles to May 1, 1963. The data are calculated for all flight sequential conditions by total missile and by individual production sections. However, in order to reduce the size of this report, only selected conditions have been included in the following section. The conditions are as follows:

- (1) Start action, stage one - total missile
- (2) Start action, stage two - total missile
- (3) Skirt jettison, stage two - total missile
- (4) Start action, stage three - total missile
- (5) Skirt jettison, stage three - total missile
- (6) Prelaunch, stage one - each production section

In order to complete some of the sequential conditions, calculated means and dispersions have been included for some components whose changes from the prelaunch condition could not be determined by actual measurement.

Detailed derivation of the mean and dispersion values for inter-stage structure, aft skirt structure, base heat deflectors, and raceway covers and caps will be found in section 5 of this report. Summary totals for the remaining components are also included in section 5 but their details have been omitted for reasons of brevity.

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
T 42	PRELAUNCH	1.02	0.10	256.85	0.	100.00	0.	100.00	0.			
T 44	PRELAUNCH	18.64	1.13	305.31	1.64	106.04	0.39	110.67	0.76			
T 45	PRELAUNCH	183.42	2.39	336.26	0.29	99.88	0.22	101.49	0.22			
T 46	PRELAUNCH	32.90	1.92	454.19	3.03	105.98	0.44	110.42	0.77			
T 47	PRELAUNCH	372.76	6.02	494.14	0.39	99.98	0.29	100.94	0.29			
T 48	PRELAUNCH	60.86	2.62	704.51	5.45	109.86	0.57	116.66	0.97			
T 49	PRELAUNCH	282.57	4.97	766.72	0.27	100.82	0.33	101.09	0.32			

SUMMARY

W DELTA X 0.150673E 06	W DELTA Y 0.234750E 05	W DELTA Z 0.258177E 05	DELTA W X 0.179612E 07	DELTA W Y 0.697934E 03	DELTA W Z 0.182809E 04
WDX/W 0.408	WDY/W 0.161	WDZ/W 0.169	DWDX/W 1.408	DWDY/W 0.028	DWDZ/W 0.045

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
MISSILE PRELAUNCH	952.17	8.86	552.73	1.82	101.17	0.19	102.61	0.21			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
T 42	S A STG 2	1.02	0.10	256.85	0.	100.00	0.	100.00	0.			
T 44	S A STG 2	17.41	1.14	305.51	1.75	105.74	0.43	110.18	0.84			
T 45	S A STG 2	175.74	2.42	336.24	0.30	99.85	0.23	101.51	0.23			
T 46	S A STG 2	31.74	1.92	455.91	3.22	105.75	0.47	110.30	0.82			
T 47	S A STG 2	231.62	10.63	484.09	0.98	99.51	0.99	101.60	1.01			

SUMMARY

W DELTA X 0.656767E 05	W DELTA Y 0.544926E 05	W DELTA Z 0.572512E 05	DELTA W X 0.554108E 06	DELTA W Y 0.221187E 03	DELTA W Z 0.397156E 03
WDX/W 0.560	WDY/W 0.510	WDZ/W 0.523	DWDX/W 1.627	DWDY/W 0.033	DWDZ/W 0.044

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
MISSILE S A STG 2	457.53	11.13	418.04	2.19	100.31	0.54	102.49	0.57			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
T 42	SKIRT JETT	1.02	0.10	256.85	0.	100.00	0.	100.00	0.			
T 44	SKIRT JETT	17.41	1.14	305.51	1.75	105.74	0.43	110.18	0.84			
T 45	SKIRT JETT	175.74	2.42	336.24	0.30	99.85	0.23	101.51	0.23			
T 46	SKIRT JETT	31.14	1.92	454.12	3.25	105.86	0.47	110.22	0.83			
T 47	SKIRT JETT	26.37	1.70	472.87	0.83	105.21	0.74	105.71	0.74			

SUMMARY

W DELTA X 0.144294E 05	W DELTA Y 0.228483E 04	W DELTA Z 0.289648E 04	DELTA W X 0.743554E 05	DELTA W Y 0.145378E 03	DELTA W Z 0.255262E 03
WDX/W 0.477	WDY/W 0.190	WDZ/W 0.214	DWDX/W 1.083	DWDY/W 0.048	DWDZ/W 0.063

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
MISSILE SKIRT JETT	251.68	3.71	362.69	1.56	101.56	0.24	103.62	0.28			

(STAGE 2)

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WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
T 42	S A STG 3	1.02	0.10	256.85	0.	100.00	0.	100.00	0.			
T 44	S A STG 3	17.41	1.14	305.51	1.75	105.74	0.43	110.18	0.84			
T 45	S A STG 3	114.70	4.59	329.02	0.51	100.16	0.52	101.55	0.53			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.435017E 04	0.361345E 04	0.390942E 04	0.837956E 03	0.417776E 02	0.997056E 02
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.495	0.452	0.470	0.217	0.049	0.075

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
MISSILE S A STG 3	133.13	4.73	325.39	0.71	100.89	0.50	102.67	0.54			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
T 42	SKIRT JETT	1.02	0.10	259.62	0.	100.00	0.	100.00	0.			
T 44	SKIRT JETT	17.41	1.14	305.51	1.75	105.74	0.43	110.18	0.84			
T 45	SKIRT JETT	27.26	1.56	322.62	1.03	103.80	0.90	104.21	0.96			

SUMMARY

W DELTA X 0.171663E 04	W DELTA Y 0.657962E 03	W DELTA Z 0.898721E 03	DELTA W X 0.292832E 03	DELTA W Y 0.338852E 01	DELTA W Z 0.306421E 02
WDX/W 0.907	WDY/W 0.561	WDZ/W 0.656	DWDX/W 0.375	DWDY/W 0.040	DWDZ/W 0.121

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
MISSILE SKIRT JETT	45.69	1.93	314.69	1.28	104.45	0.60	106.39	0.78			

(STAGE 3)

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6009	ATTACH 42	1.02	3.10	256.85	-0.	100.00	0.	100.00	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.	0.	0.	0.145519E-12	0.909495E-14	0.909495E-14
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.	0.	0.	0.000	0.000	0.000

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
ATTACHMENTS SECT 42 PRELAUNCH	1.02	3.10	256.85	0.00	100.00	0.00	100.00	0.00			

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WEIGHT AND BALANCE

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6006	BASE HEAT DFL	5.94	0.23	133.32	0.68	100.00	0.	100.00	0.			
6011	SUPPORT COMP	2.31	0.11	77.44	0.90	109.49	0.03	116.22	0.03			
6005	RACEWAY COMP	7.62	0.30	80.91	1.24	110.36	0.49	118.07	0.39			
6009	ATTACHMENTS	1.83	-0.	78.41	-0.	102.18	0.	105.20	0.			
6009	BMS 5-62	0.94	1.06	99.20	18.77	106.24	2.12	115.20	8.29			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.421221E 03	0.179173E 02	0.695610E 02	0.994425E 02	0.918772E 01	0.343377E 02
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
1.101	0.227	0.447	0.535	0.163	0.314

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 44 PRELAUNCH	18.64	1.13	97.86	1.64	106.04	0.39	110.67	0.76			

WEIGHT AND BALANCE

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6501	2-3 INSTG	156.83	1.73	67.33	0.25	99.36	0.15	100.95	0.14			
6005	RACEWAY COMP2	1.25	0.08	54.92	0.23	110.46	0.50	118.14	0.50			
6005	RACEWAY COMP3	1.09	0.08	83.32	0.30	111.00	0.50	119.00	0.50			
6020	ARM DISARM 3	2.84	0.02	78.10	0.	90.50	0.	81.50	0.			
6011	SUPPORT COMP1	2.88	0.20	56.96	0.28	110.85	0.07	114.86	0.06			
6011	SUPPORT COMP3	0.01	-0.	87.80	-0.	109.90	0.	115.80	0.			
6503	ORD ASSY 2	3.35	0.06	61.82	0.17	90.86	0.07	97.14	0.01			
6503	ORD ASSY	1.21	0.06	74.00	0.	99.14	0.	98.78	0.			
6507	DISC BRKT 1	5.08	0.48	61.21	0.36	110.64	0.19	110.64	0.19			
6507	DISC BRKT 2	1.05	0.15	70.80	-0.	112.86	0.20	112.94	0.20			
6010	INSUL COMP	0.56	0.	55.01	0.	97.06	0.	95.81	0.			
6009	ATTACHMENTS 1	2.13	-0.	51.64	-0.	101.99	0.	102.00	0.			
6009	ATTACHMENTS 2	0.09	-0.	54.43	-0.	109.20	0.	116.00	0.			
6009	ATTACHMENTS 3	1.87	-0.	86.32	-0.	100.28	0.	102.62	0.			
6009	BMS 5-62 1	0.77	1.22	60.76	8.96	109.22	1.45	110.86	3.24			
6009	BMS 5-62 2	1.99	0.80	60.14	2.05	99.30	5.24	106.48	6.34			
6009	BMS 5-62 3	0.42	0.54	80.20	6.24	105.34	11.44	108.78	20.76			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.161285E 04	0.688229E 03	0.725196E 03	0.154896E 03	0.176841E 03	0.196528E 03
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.219	0.143	0.147	0.068	0.073	0.076

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 45 PRELAUNCH	183.42	2.39	67.03	0.29	99.88	0.22	101.49	0.22			

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WEIGHT AND BALANCE

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	INPUT Y	Y DISP	Z	Z DISP	IX	IY	IZ
6008	BASE HEAT DFL	15.55	0.58	192.65	0.56	100.00	0.	100.00	0.			
6005	RACEWAY COMP	13.50	0.53	104.53	1.56	111.75	0.32	120.36	0.32			
6011	SUPPORT COMP	0.79	0.07	92.42	4.90	111.20	0.	119.52	0.01			
6009	ATTACHMENTS	0.72	0.	92.98	0.	108.50	0.	115.37	0.			
6009	BMS 5-62	2.34	1.75	118.26	13.35	109.92	1.93	117.76	3.98			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.151021E 04	0.390585E 02	0.105398E 03	0.368665E 04	0.690110E 02	0.229563E 03
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
1.181	0.190	0.312	1.846	0.253	0.461

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 46 PRELAUNCH	32.90	1.92	146.61	3.03	105.98	0.44	110.42	0.77			
TOTALS											

WEIGHT AND BALANCE

MRCN	DESCRIPTION	WT	WT	X	Y	Z	IX	IY	IZ
		DISP	DISP	DISP	DISP	DISP			
6701	1-2 INITSG	342.03	5.34	78.01	99.61	100.28			
6005	RACEWAY COMP2	0.75	0.05	53.00	113.60	124.00			
6005	RACEWAY COMP3	1.61	0.14	105.52	116.50	128.50			
6011	SUPPORT COMPI	2.08	0.12	57.65	112.38	117.94			
6011	SUPPORT COMP3	0.09	0.01	98.50	113.60	126.10			
6020	ARM DISARM	3	0.02	89.40	92.00	73.00			
6703	ORD ASSY	2	4.49	68.43	84.27	107.88			
6703	ORD ASSY	3	1.55	85.15	99.59	98.61			
6706	DISC BRKT	1	8.23	63.88	113.42	113.42			
6706	DISC BRKT	2	1.88	80.00	117.23	117.27			
6010	INSUL CGMP	0.57	0.10	60.98	95.42	97.49			
6009	ATTACHMENTS	1	1.62	76.39	104.16	103.94			
6009	ATTACHMENTS	2	0.09	53.50	110.20	119.50			
6009	ATTACHMENTS	3	1.78	83.68	99.95	103.71			
6009	BMS 5-62	1	0.83	60.70	109.10	111.52			
6009	BMS 5-62	2	1.53	68.68	96.26	111.90			
6009	BMS 5-62	3	0.79	96.60	109.16	113.52			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.109757E 05	0.661638E 04	0.570795E 04	0.172048E 04	0.651268E 03	0.112221E 04

WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.281	0.218	0.203	0.111	0.068	0.090

TOTALS

DESCRIPTION	WT	WT	X	Y	Z	IX	IY	IZ
		DISP	DISP	DISP	DISP			
SECT 47 PRELAUNCH	372.76	6.02	77.62	99.98	100.94			

WEIGHT AND BALANCE

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6007	BASE HEAT DFL	25.36	0.90	318.61	0.78	100.00	0.	100.00	0.			
6005	RACEWAY COMP	30.62	0.98	162.14	3.13	117.43	0.22	129.66	0.23			
6010	INSUL COMP	0.79	0.	156.59	0.	116.50	0.	129.00	0.			
6009	ATTACHMENTS	1.32	0.	171.12	0.	114.24	0.	116.95	0.			
6009	BMS 5-62	2.77	2.26	194.04	63.42	112.50	7.42	121.76	12.92			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.404378E 05	0.467821E 03	0.133041E 04	0.170110E 05	0.169346E 03	0.520124E 03
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
3.304	0.355	0.599	2.143	0.214	0.375

DESCRIPTION	WT	WT DISP	TOTALS			IX	IY	IZ
			X	Y	Z			
SECT 48 PRELAUNCH	60.86	2.62	228.91	109.86	116.66			

WEIGHT AND BALANCE

MRCN	DESCRIPTION	WT	WT DISP	INPUT			IX	IY	IZ
				X	Y	Z			
				DISP	DISP	DISP			
6901	AFT SKIRT	274.58	4.77	68.74	100.49	100.59			
6005	RACEWAY COMP	2.42	0.29	57.26	117.80	129.80			
6011	SUPPORT COMP	1.33	0.	63.04	119.63	131.00			
6009	ATTACHMENTS	2.18	0.	56.05	106.29	106.04			
6009	BMS 5-62	2.06	1.37	63.16	106.46	108.98			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	W DELTA W X	W DELTA W Y	W DELTA W Z
0.454377E 04	0.706925E 04	0.586123E 04	0.652090E 02	0.864598E 02	0.191891E 03
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.239	0.298	0.271	0.029	0.033	0.049

TOTALS					
DESCRIPTION	WT	WT DISP	X	Y	Z
SECT 49 PRELAUNCH	282.57	4.97	68.48	100.82	101.09
			DISP	DISP	DISP
			0.27	0.33	0.32

CTLI DATA SUMMARY

The data appearing in this section are based upon the CTLI mass properties found in Reference 1.1.4. The data are for a complete CTLI installation consisting of both Boeing and other Associate Contractor components. The Aerojet downstage kit weights are based upon data transmitted to Boeing by Aerojet document 0162-OLDR-NMPO-1, "Nominal Mass Properties and Dispersions for Minuteman CTLI/AODS," dated January 28, 1963. All data reflect the use of a linear shaped charge destruct system on the first stage engine. The total mass properties include the deletion of certain hardware which is removed when the CTLI kit is installed. The check lists found in Reference 1.1.4 give a more detailed summary of the changes.

The statistical sample for the CTLI Section consists of two actual weights. Since these sections are nearly identical to the Wing I sections, the statistical data from Wing I was used to help derive the Wing II dispersions. Details of this derivation can be found in section 5 of this report. Other CTLI components were given mass properties and dispersions based upon the data available.

The dispersion computations found in this report are based upon a population of .990 and a confidence of 90% in accordance with directions received from STL on 30 January 1963.

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4.1 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																		
MISSILE CTLI INSTALLATION																		
COMPONENT TOTAL MISSILE																		
FLIGHT SEQUENCE			% EXP WT	WEIGHT			CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²					
				NOM.	DISP.		LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW			
L I N E	S T A G E						NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.
1	I	Pre-Launch	0	273.18	3.26	326.70	2.73	106.09	.44	110.84	.33	16.3	1370.9	1364.8				
2			25	272.48	3.26	326.33	2.74	106.06	.44	110.80	.33							
3			50															
4			75															
5		End Action Time	100	272.48	3.26	326.33	2.74	106.06	.44	110.80	.33	16.3	1370.9	1364.8				
6																		
7	II	Start Action Time	0	213.50	2.62	257.94	1.88	103.20	.52	106.06	.35	9.2	200.5	197.9				
8			25	213.50	2.62	257.94	1.88	103.20	.52	106.06	.35							
9		Skirt Jettison	35	214.60	2.62	259.07	1.86	103.25	.52	106.15	.35							
10			50															
11			75															
12		End Action Time	100	214.60	2.62	259.07	1.86	103.25	.52	106.15	.35	9.2	200.5	197.9				
13																		
14	III	Start Action Time	0	169.50	1.95	227.76	1.25	100.85	.59	102.18	.35	5.6	15.3	14.3				
15		Skirt Jettison	1	170.80	1.95	228.50	1.24	100.92	.59	102.30	.35							
16			25															
17			50															
18			75															
19		End Action Time	100	170.80	1.95	228.50	1.24	100.92	.59	102.30	.35	5.6	15.3	14.3				
20																		
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																		
21	I	Silo Heat Protection		.7		476.3		114.4		126.1								
22		Base Heat Protection																
23																		
24	II	Aft Interstage 1-2																
25		Jettisoned Fwd Interstage 1-2																
26		Base Heat Protection																
27																		
28	III	Aft Interstage 2-3																
29		Jettisoned Fwd Interstage 2-3																
30		Base Heat Protection																
31																		

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4.2.1 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																			
MISSILE CTLI INSTALLATION										COMPONENT SECTION 39 (CTLI SECTION)									
LINE	STAGE	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY			VERT. (Z)			ROLL			PITCH			YAW	
				NOM.	DISP.	LONG. (X)	NOM.	DISP.	LAT. (Y)	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.	NOM.	DISP.
1	I	Pre-Launch	0	148.45	1.69	54.77	1.01	99.66	.62	100.18	.30	4			2			2	
2			25	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
3			50																
4			75																
5		End Action Time	100																
6																			
7	II	Start Action Time	0																
8			25																
9		Skirt Jettison																	
10			50																
11			75																
12		End Action Time	100																
13																			
14	III	Start Action Time	0																
15		Skirt Jettison																	
16			25																
17			50	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
18			75																
19		End Action Time	100	148.45	1.69	54.77	1.01	99.66	.62	100.18	.30	4			2			2	
20																			
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																			
21	I	Silo Heat Protection																	
22		Base Heat Protection																	
23																			
24	II	Aft Interstage 1-2																	
25		Jettisoned Fwd Interstage 1-2																	
26		Base Heat Protection																	
27																			
28	III	Aft Interstage 2-3																	
29		Jettisoned Fwd Interstage 2-3																	
30		Base Heat Protection																	
31																			

4.2.2 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																			
MISSILE CTLI INSTALLATION										COMPONENT SECTION 42 (GUIDANCE SECTION)									
LINE		STAGE		FLIGHT SEQUENCE		% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²				
							NOM.	DISP.	LONG. (X)		LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW		
1	I	Pre-Launch	0	5.57	.47		68.22	.58	111.66	.26	114.73	.32	0	0	0				
2			25	▲	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲				
3			50																
4			75																
5		End Action Time	100																
6																			
7	II	Start Action Time	0																
8			25																
9		Skirt Jettison																	
10			50																
11			75																
12		End Action Time	100																
13																			
14	III	Start Action Time	0																
15		Skirt Jettison																	
16			25																
17			50	▼	▼		▼	▼	▼	▼	▼	▼	▼	▼	▼				
18			75																
19		End Action Time	100	5.57	.47		68.22	.58	111.66	.26	114.73	.32	0	0	0				
20																			
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																			
21	I	Silo Heat Protection																	
22		Base Heat Protection																	
23																			
24	II	Aft Interstage 1-2																	
25		Jettisoned Fwd Interstage 1-2																	
26		Base Heat Protection																	
27																			
28	III	Aft Interstage 2-3																	
29		Jettisoned Fwd Interstage 2-3																	
30		Base Heat Protection																	
31																			

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[illegible]

EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME

[illegible]

4.2.4 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																			
MISSILE CTLI INSTALLATION										COMPONENT SECTION 45 (INTERSTAGE 2-3)									
LINE	STAGE	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²							
				NOM.	DISP.	LONG. (X)	LAT. (Y)		VERT. (Z)		ROLL	PITCH	YAW						
1	I	Pre-Launch	0	17.51	.97	65.54	1.22	111.89	.14	120.22	.15	0	1	1					
2			25	17.41	.97	65.52	1.23	111.90	.14	120.23	.15								
3			50																
4			75																
5		End Action Time	100																
6																			
7	II	Start Action Time	0																
8			25																
9		Skirt Jettison																	
10			50																
11			75																
12		End Action Time	100	17.41	.97	65.52	1.23	111.90	.14	120.23	.15								
13																			
14	III	Start Action Time	0	-1.30	0	56.25	0	109.76	0	117.74	0	0	0	0					
15		Skirt Jettison		0	0	0	0	0	0	0	0								
16			25																
17			50																
18			75																
19		End Action Time	100																
20																			
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																			
21	I	Silo Heat Protection		.10	0	69.20	0	110.90	0	118.70									
22		Base Heat Protection																	
23																			
24	II	Aft Interstage 1-2																	
25		Jettisoned Fwd Interstage 1-2																	
26		Base Heat Protection																	
27																			
28	III	Aft Interstage 2-3		18.71	.97	64.88	1.22	111.75	.14	120.06									
29		Jettisoned Fwd Interstage 2-3		1.30	0	56.25	0	109.76	0	117.74	0								
30		Base Heat Protection																	
31																			

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4.2.5 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																		
MISSILE CTI INSTALLATION																		
LINE	STAGE	FLIGHT SEQUENCE	% EXP WT	WEIGHT			CENTER OF GRAVITY						VERT. (Z)			ROLL		
				NOM.	DISP.		LONG. (X)	DISP.	NOM.	LAT. (Y)	DISP.		NOM.	DISP.		NOM.	PITCH	YAW
1	I	Pre-Launch	0	26.39	1.46		99.43	1.41	112.63	.22			121.75	.23		0	5	5
2			25	✓	✓		✓	✓	✓	✓			✓	✓		✓	✓	✓
3			50															
4			75															
5		End Action Time	100															
6																		
7	II	Start Action Time	0															
8			25															
9		Skirt Jettison																
10			50	✓	✓		✓	✓	✓	✓			✓	✓		✓	✓	✓
11			75															
12		End Action Time	100	26.39	1.46		99.43	1.41	112.63	.22			121.75	.23		0	5	5
13																		
14	III	Start Action Time	0															
15		Skirt Jettison																
16			25															
17			50															
18			75															
19		End Action Time	100															
20																		
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																		
21	I	Silo Heat Protection																
22		Base Heat Protection																
23																		
24	II	Aft Interstage 1-2																
25		Jettisoned Fwd Interstage 1-2																
26		Base Heat Protection																
27																		
28	III	Aft Interstage 2-3																
29		Jettisoned Fwd Interstage 2-3																
30		Base Heat Protection																
31																		

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4.2.7 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																			
MISSILE CULI INSTALLATION																			
S T A G E		FLIGHT SEQUENCE		% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²						
L I N E					NOM.	DISP.	LONG. (X)	DISP.	NOM.	DISP.	LAT. (Y)	DISP.	NOM.	DISP.	ROLL	PITCH	YAW	NOM.	
1	I	Pre-launch		0	26.76	1.46	116.72	2.73	117.61	.28	130.14	.27	2	50	50				
2				25	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	
3				50	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	
4				75	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	
5		End Action Time		100	26.76	1.46	116.72	2.73	117.61	.28	130.14	.27	2	50	50				
6																			
7	II	Start Action Time		0															
8				25															
9		Skirt Jettison																	
10				50															
11				75															
12		End Action Time		100															
13																			
14	III	Start Action Time		0															
15		Skirt Jettison																	
16				25															
17				50															
18				75															
19		End Action Time		100															
20																			
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																			
21	I	Silo Heat Protection																	
22		Base Heat Protection																	
23																			
24	II	Aft Interstage 1-2																	
25		Jettisoned Fwd Interstage 1-2																	
26		Base Heat Protection																	
27																			
28	III	Aft Interstage 2-3																	
29		Jettisoned Fwd Interstage 2-3																	
30		Base Heat Protection																	
31																			

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4.2.8 SEQUENTIAL MASS DATA SUMMARY (NOMINALS AND DISPERSIONS)																			
MISSILE CTEI INSTALLATION																			
COMPONENT SECTION 49 (AFT SKIRT)																			
LINE	STAGE	FLIGHT SEQUENCE	% EXP WT	WEIGHT		CENTER OF GRAVITY						MOMENT OF INERTIA SLUG FEET ²							
				NOM.	DISP.	LONG. (X)	LAT. (Y)	VERT. (Z)	ROLL	PITCH	YAW								
1	I	Pre-Launch	0	7.77	.66	74.54	118.14	.43	129.61	.50	0	0	0						
2			25	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑						
3			50	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓						
4			75	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓						
5		End Action Time	100	7.77	.66	74.54	118.14	.43	129.61	.50	0	0	0						
6																			
7	II	Start Action Time	0																
8			25																
9		Skirt Jettison	50																
10			75																
11		End Action Time	100																
12																			
13																			
14	III	Start Action Time	0																
15		Skirt Jettison	25																
16			50																
17			75																
18		End Action Time	100																
19																			
20																			
EXPENDED WEIGHTS DURING FLIGHT SEQUENCE ACTION TIME																			
21	I	Silo Heat Protection																	
22		Base Heat Protection																	
23																			
24	II	Aft Interstage 1-2																	
25		Jettisoned Fwd Interstage 1-2																	
26		Base Heat Protection																	
27																			
28	III	Aft Interstage 2-3																	
29		Jettisoned Fwd Interstage 2-3																	
30		Base Heat Protection																	
31																			

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WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 39	PRE-LAUNCH	148.45	1.69	220.69	1.01	99.66	0.62	100.18	0.30			
SECT 42	PRE-LAUNCH	5.57	0.47	244.14	0.58	111.66	0.26	114.73	0.32			
SECT 44	PRE-LAUNCH	16.78	0.86	292.41	2.26	108.50	0.32	116.95	0.25			
SECT 45	PRE-LAUNCH	17.51	0.97	334.74	1.22	111.89	0.14	120.22	0.15			
SECT 46	PRE-LAUNCH	26.39	1.46	406.98	1.41	112.63	0.22	121.75	0.23			
SECT 47	PRE-LAUNCH	23.95	1.07	491.27	1.93	114.68	0.15	125.19	0.17			
SECT 48	PRE-LAUNCH	26.76	1.46	592.28	2.73	117.61	0.28	130.14	0.27			
SECT 49	PRE-LAUNCH	7.77	0.66	772.74	0.99	118.14	0.43	129.61	0.50			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.333026E 05	0.862203E 04	0.213175E 04	0.316284E 06	0.683085E 03	0.187531E 04

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 39	PRE-LAUNCH	148.45	1.69	220.69	1.01	99.66	0.62	100.18	0.30			
SECT 42	PRE-LAUNCH	5.57	0.47	244.14	0.58	111.66	0.26	114.73	0.32			
SECT 44	PRE-LAUNCH	16.78	0.86	292.41	2.26	108.50	0.32	116.95	0.25			
SECT 45	25(80 ST1	17.41	0.97	334.72	1.23	111.90	0.14	120.23	0.15			
SECT 46	PRE-LAUNCH	26.39	1.46	406.98	1.41	112.63	0.22	121.75	0.23			
SECT 47	SA ST 2	-1.10	0.	477.38	0.	113.70	0.	123.80	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.257721E 05	0.854176E 04	0.204780E 04	0.577788E 05	0.333299E 03	0.916965E 03
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.752	0.433	0.212	1.126	3.086	0.142

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
START ACTION ST 2	213.50	2.62	257.94	1.88	103.20	0.52	106.06	0.35			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 39	PRE-LAUNCH	148.45	1.69	220.69	1.01	99.66	0.62	100.18	0.30			
SECT 42	PRE-LAUNCH	5.57	0.47	244.14	0.58	111.66	0.26	114.73	0.32			
SECT 44	PRE-LAUNCH	16.78	0.86	292.41	2.26	108.50	0.32	116.95	0.25			
SECT 45	SA ST 3	-1.30	0.	325.45	0.	109.76	0.	117.74	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.239289E 05	0.850211E 04	0.200414E 04	0.329345E 04	0.731227E 02	0.207505E 03
WDY/W	WDZ/W	WDY/W	DWDY/W	DWDZ/W	
0.913	0.544	0.264	0.050	0.085	

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
START ACTION ST 3	169.50	1.95	227.76	1.25	100.85	0.59	102.18	0.35			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6301CTLI	WAFER	144.83	1.67	54.72	1.03	99.44	0.62	99.88	0.28			
6302CABLE	ASSY SET	2.21	0.22	56.50	1.00	109.80	0.50	116.00	0.50			
6304CCND	SUPT SET	0.54	0.08	56.30	0.38	111.60	0.	111.60	0.			
6306INSTL	KIT	0.67	0.	58.90	0.	101.20	0.	101.20	0.			
6312BMS	5 62	0.20	0.02	54.50	0.	111.50	0.	111.50	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.222581E 05	0.806429E 04	0.164572E 04	0.166917E-00	0.608017E 01	0.132501E 02
WDY/W	WDY/W	WDZ/W	DWDY/W	DWDY/W	DWDZ/W
1.005	0.605	0.273	0.003	0.017	0.025

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 39PRE-LAUNCH	148.45	1.69	54.77	1.01	99.66	0.62	100.18	0.30			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6302CABLE	ASSY SET	1.98	0.20	65.80	1.00	110.50	0.50	117.20	0.50			
6304CCNC	SUPT SET	3.02	0.42	69.80	0.45	112.60	0.	113.30	0.			
6009PART	REMOVAL	-0.20	0.	66.60	0.	111.00	0.	109.80	0.			
6306INSTL	KIT	0.37	0.	70.50	0.	111.10	0.	111.90	0.			
6312BMS	5 62	0.40	0.04	65.40	0.	110.50	0.	113.50	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.576728E 01	0.980100E 00	0.980100E 00	0.686099E 00	0.211726E-00	0.608234E 00
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.431	0.178	0.178	0.149	0.083	0.140

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 42PRE-LAUNCH	5.57	0.47	68.22	0.58	111.66	0.26	114.73	0.32			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6302	CABLE ASSY SET	6.47	0.65	92.90	1.00	111.20	0.50	118.40	0.50			
6304	CCND SUPT SET	13.33	0.56	87.60	2.39	110.80	0.	117.70	0.			
6306	INSTL KIT	1.13	0.	77.40	0.	110.20	0.	117.50	0.			
6312	BMS 5 62	0.20	0.02	80.90	0.	109.30	0.	116.20	0.			
6604	DESTRUCT SYS	4.03	0.04	58.10	0.	99.80	0.	114.00	0.			
6009	PART REMOVAL	-8.38	0.	81.20	0.	110.30	0.	117.90	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.105684E 04	0.104652E 02	0.104652E 02	0.297507E 02	0.484625E 01	0.107875E 01
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
1.937	0.193	0.193	0.325	0.131	0.062

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 44PRE-LAUNCH	16.78	0.86	84.99	2.26	108.50	0.32	116.95	0.25			

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WEIGHT AND BALANCE

INPUT

MACH	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
	6302CABLL ASSY SET	4.36	0.44	64.90	1.00	112.00	0.50	119.90	0.50			
	6304CCND SUPT SET	15.55	0.86	66.63	1.28	111.70	0.	120.20	0.			
	6306INSTL KIT	1.26	0.	75.00	0.	111.30	0.	119.70	0.			
	6312BMS 5 62 FOR 2	0.20	0.02	53.60	0.	110.80	0.	116.70	0.			
	6312BMS 5 62 POR 3	0.20	0.02	85.00	0.	103.00	0.	101.80	0.			
	6CC9PART REMOVAL 2	-1.50	0.	55.90	0.	109.90	0.	117.60	0.			
	6CC9PART REMOVAL 3	-2.56	0.	81.80	0.	111.00	0.	119.10	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.415179E 03	0.475240E 01	0.475240E 01	0.112257E 01	0.618282E-01	0.161269E-00
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
1.164	0.125	0.125	0.061	0.014	0.023

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 45PRE-LAUNCH	17.51	0.97	65.54	1.22	111.89	0.14	120.22	0.15			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6302	CABLE ASSY SET	10.75	1.08	111.10	1.00	112.80	0.50	121.20	0.50			
6304	CCND SUPT SET	20.92	0.95	108.60	0.82	112.20	0.	121.20	0.			
6306	INSTL KIT	1.93	0.	81.40	0.	111.50	0.	119.90	0.			
6303	INTERVAL TIMER	1.50	0.15	67.10	0.	112.50	0.	121.80	0.			
6310	BATTERY	1.40	0.16	63.90	0.	112.50	0.	121.80	0.			
6604	DESTRUCT SYS	4.19	0.03	74.80	0.	111.80	0.	121.80	0.			
6009	PART REMOVAL	-14.30	0.	105.10	0.	111.70	0.	120.30	0.			

SUMMARY

W DELTA X	0.409836E 03	W DELTA Y	0.288906E 02	W DELTA Z	0.288906E 02	DELTA W X	0.291162E 03	DELTA W Y	0.203462E-00	DELTA W Z	0.634648E 00
WDX/W	0.767	WDY/W	0.204	WDZ/W	0.204	DWDX/W	0.647	DWDY/W	0.017	DWDZ/W	0.030

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 46PRE-LAUNCH	26.39	1.46	99.43	1.41	112.63	0.22	121.75	0.23			

WEIGHT AND BALANCE

INPUT

MRGN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6302	CABLE ASSY SET	2.40	0.55	71.20	1.00	115.80	0.50	126.40	0.50			
6304	CNCL SUPT SET	21.13	0.92	77.80	2.00	114.80	0.	125.60	0.			
6306	INSTL KIT	1.21	0.	86.50	0.	115.20	0.	126.00	0.			
6312	BFS 5 62 POR 3	0.50	0.05	74.70	0.	102.00	0.	103.40	0.			
6009	PART REMOVAL 2	-1.10	0.	60.90	0.	113.70	0.	123.80	0.			
6009	PART REMOVAL 3	-3.27	0.	100.30	0.	115.90	0.	127.30	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.181554E 04	0.750760E 01	0.750760E 01	0.125691E 02	0.791865E 00	0.177172E 01
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
1.779	0.114	0.114	0.148	0.037	0.056

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 47PRE-LAUNCH	23.95	1.07	74.79	1.93	114.68	0.15	125.19	0.17			

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WEIGHT AND BALANCE

INPUT

M/R	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6302	CABLE ASSY SET	13.12	1.31	156.40	1.00	118.20	0.50	130.50	0.50			
6304	CCND SUPT SET	9.68	0.59	78.70	0.84	117.20	0.	129.90	0.			
6306	INSTL KIT	2.56	0.	92.40	0.	117.20	0.	130.00	0.			
6303	INTERVAL TIMER	1.50	0.15	70.60	0.	117.70	0.	130.50	0.			
6310	BATTERY	1.40	0.16	66.70	0.	117.70	0.	130.50	0.			
6312	MS 5 62	0.80	0.08	161.30	0.	116.20	0.	128.00	0.			
6604	DESTRUCT SYS	6.19	0.04	78.10	0.	116.90	0.	129.30	0.			
6009	PART REMOVAL	-8.49	0.	87.00	0.	117.30	0.	129.70	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.238251E 03	0.430336E 02	0.430336E 02	0.333209E 04	0.663869E 00	0.282779E-00
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.577	0.245	0.245	2.157	0.030	0.020

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
SECT 48 PRE-LAUNCH	26.76	1.46	116.72	2.73	117.61	0.28	130.14	0.27			

WEIGHT AND BALANCE

INPUT

PRC. DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
2302CABLE ASSY SET	6.63	0.66	73.20	1.00	118.20	0.50	130.50	0.50			
6306INSTL KIT	1.56	0.	74.10	0.	117.80	0.	124.50	0.			
6312BAS 5 62	0.20	0.02	101.30	0.	119.20	0.	133.90	0.			
6009PART REMOVAL	-0.62	0.	67.70	0.	118.30	0.	127.60	0.			

SUMMARY

W DELTA X	W DELT. Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.439569E 02	0.109892E 02	0.109892E 02	0.107188E 01	0.215587E-02	0.349072E-00
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.853	0.427	0.427	0.133	0.006	0.076

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
<u>SECT 49PRE-LAUNCH</u>	7.77	0.66	74.54	0.99	118.14	0.43	129.61	0.50			

WEIGHT AND BALANCE

INPUT

PART DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
6302CABLE ASSY SET	6.63	0.66	73.20	1.00	118.20	0.50	130.50	0.50			
6306INSTL KIT	1.56	0.	74.10	0.	117.80	0.	124.50	0.			
6312BBS 5 62	0.20	0.02	101.30	0.	119.20	0.	133.90	0.			
6009PART REMOVAL	-0.62	0.	67.70	0.	118.30	0.	127.60	0.			

SUMMARY

W DELTA X	W DELT. Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.439569E 02	0.109892E 02	0.109892E 02	0.107188E 01	0.215587E-02	0.349072E-00
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.853	0.427	0.427	0.133	0.006	0.076

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IV	IZ
SECT 49PRE-LAUNCH	7.77	0.66	74.54	0.99	118.14	0.43	129.61	0.50			

DATA SAMPLES FOR MAJOR COMPONENTS

The following pages summarize by major components the data samples used to derive the means and dispersion values used in the preceding sections of this document. The components include the CTLI section, both interstages, the aft skirt, the three base heat deflectors, and raceway covers and caps. Sample data for components other than these are not listed in detail, but are summarized by part number under the applicable figure A. Details are on file and can be supplied upon request.

The CTLI statistical sample for this report consists of two actual weights of Wing II CTLI Section which were nearly identical to the Wing I sections reported in Reference 1.1.5. Since the sample size was so small, the method of statistical analysis used for these components varies from that used in the remainder of this report. In this instance a two sided tolerance factor, K_{ru} was derived with the assistance of the statistical data obtained during Wing I production of CTLI sections. Factors for $r(N,P)$ and $u(f,\gamma)$ were taken from Tables of Tolerance-Limit Factors for Normal Distribution by Alfred Weissberg and Glenn Beatty as published in Technometrics, November 1960 (Volume 2, No. 4).

The "K" factors used for components with larger sample sizes were taken from tables in Techniques of Statistical Analysis edited by Eisenhart, Hastay, and Wallis.

The dispersion computations found in this report are based upon a population of .990 and a confidence level of 90% in accordance with STL directions received on 30 January 1963.

NOMENCLATURE EXPLANATION FOR FOLLOWING PAGES

- AW = Average Weight.
 - (KS)W = Weight Dispersion.
 - W = Summation of individual weight samples.
 - WSQ = Summation of squares of individual weight samples.
 - WN = Quantity of weight samples used.
 - KW = "K" factor from tables.
 - SW = Standard deviation for weight samples
- (Nomenclature for x,y, and z is similar to above)

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MISSILE SECTION 39			COMPONENT CTLI SECTION							
CALCULATED			NOMINAL & DISPERSION DERIVATION DRAWING NO. 25-37501							
L I N E	SAMPLE NO.	D/G DASH NO.	WEIGHT		LONG. C. G. (X)		LAT. C. G. (Y)		VERT. C. G. (Z)	
			WT	WT ²	ARM	ARM ²	ARM	ARM ²	ARM	ARM ²
1	0000022	-8	A	B	A	B	A	B	A	B
2	0000023	-8	144.45		54.74		99.44		99.94	
3			145.21		54.70		99.43		99.83	
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
DESCRIPTION			PROCEDURE	WEIGHT	LONG. C. G.		LAT. C. G.		VERT. C. G.	
21	SUM OF COLUMN A			289.66	109.44		198.87		199.77	
22	SAMPLE SIZE, n			2	2		2		2	
23	NOMINAL VALUE, μ		(21)/(22)	144.83	54.72		99.44		99.88	
24	SUM OF COLUMN B									
25	(SUM OF COLUMN A) ² /n		(21) ² /(22)							
26	SUM OF SQUARED DEVIATIONS		(24)-(25)							
27	VARIANCE, S ²		(26)/[(22)-1]							
28	STANDARD DEVIATION		√(27)	.4099	.2527		.1511		.0688	
29	% POPULATION, P			.990	.990		.990		.990	
30	% CONFIDENCE LEVEL, γ			.90	.90		.90		.90	
31	K FACTOR FOR (22), (29) & (30)			(3.0368)(1.3406)	(3.0368)(1.3406)		(3.0368)(1.3406)		(3.0368)(1.3406)	
32	TOLERANCE		(28)(31)	1.67	1.03		.62		.28	



W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
156.35	67.36	99.40	100.96	156.85	67.39	99.33	100.94	156.80	67.31	99.40	100.93
156.30	67.40	99.45	101.02	156.40	67.44	99.37	100.91	156.95	67.28	99.40	100.92
156.95	67.52	99.37	100.95	156.75	67.39	99.38	100.95	157.30	67.50	99.30	100.93
157.50	67.29	99.41	100.96	158.45	67.34	99.34	100.96	157.05	67.41	99.34	100.96
157.05	67.27	99.37	100.92	157.30	67.37	99.36	101.00	157.45	67.41	99.46	100.95
156.20	67.29	99.38	100.98	156.50	67.40	99.35	100.98	156.60	67.40	99.38	100.94
157.30	67.35	99.29	101.02	157.00	67.35	99.44	100.98	157.85	67.22	99.29	100.97
156.15	67.37	99.32	101.06	157.90	67.29	99.43	100.94	156.75	67.32	99.38	100.96
156.55	67.48	99.39	100.90	155.80	67.17	99.38	100.76	157.00	67.39	99.41	101.01
156.35	67.31	99.31	100.98	157.15	67.27	99.39	100.97	158.00	67.38	99.37	100.97
156.65	67.25	99.38	100.95	157.15	67.28	99.30	100.99	156.30	67.27	99.39	100.95
156.70	67.35	99.39	100.99	156.30	67.23	99.37	100.97	156.20	67.40	99.37	100.93
156.55	67.29	99.36	100.93	156.95	67.27	99.39	100.88	156.55	67.20	99.35	100.90
157.20	67.32	99.43	100.97	155.80	67.46	99.26	100.99	156.90	67.31	99.36	100.95
156.65	67.27	99.27	100.98	155.75	67.18	99.28	100.84	156.65	67.20	99.24	100.91
156.25	67.21	99.25	100.95	157.40	67.25	99.28	100.98	156.55	67.35	99.38	100.88
156.40	67.18	99.38	100.96	156.75	67.28	99.37	100.89	158.15	67.40	99.36	100.93
				156.85	67.41	99.32	100.97	156.55	67.36	99.34	100.97

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 050 6501 25-36103-001 INTERSTAGE 2-3
 AW= 156.83 (KS)W= 1.73 AX= 67.33 (KS)X= .25
 AY= 99.36 (KS)Y= .15 AZ=100.95 (KS)Z= .14
 W= 8311.75 WSQ= 1303511.64 WN= 53 KW=2.985 SW= .58
 X= 3568.39 XSQ= 240253.33 XN= 53 KX=2.985 SX= .08
 Y= 5266.01 YSQ= 523223.93 YN= 53 KY=2.985 SY= .05
 Z= 5350.34 ZSQ= 540115.93 ZN= 53 KZ=2.985 SZ= .05

BOEING

W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
339.45	78.06	99.54	100.30	334.60	78.08	99.62	100.02	342.55	77.83	99.65	100.27
342.02	77.90	99.59	100.30	340.92	78.12	99.57	100.21	339.35	77.81	99.67	100.24
341.30	77.87	99.75	100.20	342.95	78.03	99.55	100.30	342.10	77.87	99.74	100.24
341.95	77.99	99.62	100.23	343.05	77.95	99.66	100.26	342.30	78.11	99.68	100.30
342.90	78.18	99.60	100.20	343.20	78.07	99.55	100.23	339.65	78.06	99.77	100.32
343.95	78.07	99.59	100.26	342.05	77.90	99.60	100.28	342.85	77.92	99.50	100.31
344.40	77.96	99.59	100.38	339.60	78.05	99.53	100.47	341.40	78.07	99.51	100.36
341.60	77.99	99.62	100.21	343.05	78.15	99.47	100.32	342.60	78.02	99.63	100.34
345.00	78.03	99.68	100.27	343.85	77.95	99.69	100.26	344.35	78.37	99.70	100.19
341.75	78.00	99.57	100.31	343.75	78.09	99.61	100.26	340.25	78.02	99.43	100.33
342.50	78.08	99.67	100.28	341.50	78.05	99.54	100.25	342.55	78.14	99.58	100.33
342.60	78.00	99.53	100.29	341.30	78.03	99.72	100.29	342.05	77.92	99.44	100.35
345.40	78.01	99.65	100.32	342.80	78.10	99.66	100.22	342.50	77.98	99.60	100.32
343.45	78.07	99.68	100.30	339.45	77.97	99.58	100.30	341.70	77.97	99.64	100.24
341.70	77.89	99.56	100.25	341.30	77.85	99.61	100.31	342.15	77.92	99.58	100.29
340.60	77.96	99.63	100.31	344.55	78.03	99.62	100.33	341.70	77.94	99.71	100.26
				341.05	77.96	99.59	100.39	341.75	77.96	99.55	100.28

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
070 6701 25-36101-001 INTERSTAGE 1-2

AW=	342.03 (KS)W=	5.34	AX=	78.01 (KS)X=	.30
AY=	99.61 (KS)Y=	.23	AZ=	100.28 (KS)Z=	.20
W=	17101.34 WSQ=	5849271.77	WN=	50 KW=3.001	SW= 1.78
X=	3900.40 XSQ=	304262.88	XN=	50 KX=3.001	SX= .10
Y=	4980.42 YSQ=	496091.95	YN=	50 KY=3.001	SY= .08
Z=	5014.08 ZSQ=	502820.17	ZN=	50 KZ=3.001	SZ= .07

W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
339.45	78.06	99.54	100.30	334.60	78.08	99.62	100.02	342.55	77.88	99.65	100.27
342.02	77.90	99.59	100.30	340.92	78.12	99.57	100.21	339.35	77.81	99.67	100.24
341.30	77.87	99.75	100.20	342.95	78.03	99.55	100.30	342.10	77.87	99.74	100.24
341.95	77.99	99.62	100.23	343.05	77.95	99.66	100.26	342.30	78.11	99.68	100.30
342.90	78.18	99.60	100.20	343.20	78.07	99.55	100.23	339.65	78.06	99.77	100.32
343.95	78.07	99.59	100.26	342.05	77.90	99.60	100.28	342.85	77.92	99.50	100.31
344.40	77.96	99.59	100.38	339.60	78.05	99.53	100.47	341.40	78.07	99.51	100.36
341.60	77.99	99.62	100.21	343.05	78.15	99.47	100.32	342.60	78.02	99.63	100.34
345.00	78.03	99.68	100.27	343.85	77.95	99.69	100.26	344.35	78.37	99.70	100.19
341.75	78.00	99.57	100.31	343.75	78.09	99.61	100.26	340.25	78.02	99.43	100.33
342.50	78.08	99.67	100.28	341.50	78.05	99.54	100.25	342.55	78.14	99.58	100.33
342.60	78.00	99.53	100.29	341.30	78.03	99.72	100.29	342.05	77.92	99.44	100.35
345.40	78.01	99.65	100.32	342.80	78.10	99.66	100.22	342.50	77.98	99.60	100.32
343.45	78.07	99.68	100.30	339.45	77.97	99.58	100.30	341.70	77.97	99.64	100.24
341.70	77.89	99.56	100.25	341.30	77.85	99.61	100.31	342.15	77.92	99.58	100.29
340.60	77.96	99.63	100.31	344.55	78.03	99.62	100.33	341.70	77.94	99.71	100.26
				341.05	77.96	99.59	100.39	341.75	77.96	99.55	100.28

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 070 6701 25-36101-001 INTERSTAGE 1-2
 AW= 342.03 (KS)W= 5.34 AX= 78.01 (KS)X= .30
 AY= 99.61 (KS)Y= .23 AZ= 100.28 (KS)Z= .20
 W= 17101.34 WSQ= 5849271.77 WN= 50 KW=3.001 SW= 1.78
 X= 3900.40 XSQ= 304262.88 XN= 50 KX=3.001 SX= .10
 Y= 4980.42 YSQ= 496091.95 YN= 50 KY=3.001 SY= .08
 Z= 5014.08 ZSQ= 502820.17 ZN= 50 KZ=3.001 SZ= .07

W	X	Y	Z	W	X	Y	Z	W	X	Y	Z
275.15	68.78	100.46	100.69	273.45	68.81	100.56	100.63	276.30	68.69	100.57	100.51
275.05	68.69	100.51	100.53	274.73	68.66	100.41	100.65	272.65	68.77	100.36	100.72
276.45	68.72	100.43	100.58	273.30	68.70	100.45	100.42	277.00	68.69	100.53	100.64
275.50	68.77	100.48	100.50	274.00	68.68	100.53	100.56	275.80	68.75	100.42	100.57
276.10	68.50	100.48	100.55	276.65	68.78	100.65	100.47	270.65	68.69	100.25	100.66
275.65	68.77	100.38	100.61	274.25	68.77	100.38	100.66	276.85	68.87	100.42	100.66
276.15	68.60	100.50	100.80	273.50	68.75	100.33	100.59	274.70	68.67	100.52	100.50
277.75	68.72	100.53	100.55	273.95	68.66	100.38	100.57	275.00	68.87	100.58	100.47
274.00	68.84	100.43	100.64	276.20	68.75	100.37	100.65	272.75	68.63	100.42	100.60
276.35	68.69	100.56	100.54	272.50	68.85	100.46	100.59	274.70	68.71	100.31	100.75
276.00	68.70	100.42	100.49	277.00	68.75	100.49	100.57	274.40	68.71	100.29	100.74
275.90	68.79	100.62	100.52	274.70	68.75	100.48	100.64	274.70	68.89	100.52	100.63
272.50	68.75	100.46	100.63	274.55	68.83	100.50	100.61	275.75	68.80	100.65	100.55
273.35	68.90	100.49	100.48	271.95	68.69	100.50	100.59	273.15	68.65	100.55	100.51
275.05	68.81	100.68	100.48	275.20	68.73	100.66	100.54	275.55	68.78	100.73	100.50
274.80	68.73	100.41	100.67	271.55	68.81	100.52	100.64	271.85	68.65	100.50	100.66
275.60	68.78	100.62	100.43	274.70	68.82	100.43	100.79	272.45	68.68	100.48	100.76
272.90	68.77	100.48	100.61	272.55	68.72	100.53	100.55	274.10	68.79	100.52	100.56

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT

190 6901 25-36080-001 AFT SKIRT
 AW= 274.58 (KS)W= 4.77 AX= 68.74 (KS)X= .22
 AY= 100.49 (KS)Y= .29 AZ=100.59 (KS)Z= .26
 W= 14827.33 WSQ= 4071426.55 WN= 54 KW=2.981 SW= 1.60
 X= 3712.11 XSQ= 255181.06 XN= 54 KX=2.981 SX= .08
 Y= 5426.19 YSQ= 545251.22 YN= 54 KY=2.981 SY= .10
 Z= 5432.01 ZSQ= 546421.39 ZN= 54 KZ=2.981 SZ= .09

BOEING

W	X	W	X	W	X	W	X	W	X	W	X
5.95	132.94	6.05	133.36	6.01	133.45	6.01	132.94	6.01	132.94	6.11	133.44
6.11	133.41	6.03	133.42	6.01	133.14	6.01	133.42	6.01	133.42	6.02	133.44
5.81	133.42	5.94	133.41	5.82	133.41	5.82	133.42	5.93	133.42	5.93	133.44
5.98	133.42	5.86	133.41	5.89	133.41	5.89	133.42	5.90	133.42	5.90	133.44
5.93	133.42	5.98	133.41	5.76	133.41	5.76	133.42	5.91	133.42	5.91	133.44
5.83	133.42	5.99	133.41	5.89	133.41	5.89	133.42	5.90	133.42	5.90	133.44
5.98	133.42	5.89	133.41	5.84	133.41	5.84	133.42	5.89	133.42	5.89	133.44
5.82	133.42	6.02	133.41	5.84	133.41	5.84	133.42	5.94	133.42	5.94	133.44
5.89	133.42	5.96	133.41	5.89	133.41	5.89	133.42	5.87	133.42	5.87	133.44

340 6006 25-36379-001 BASE HEAT DEFLECTOR
 W= 302.72 WSQ=
 X= 1733.13 XSQ=
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AW= 5.94 (KS)W= 5.23 AX=133.32 (KS)X= .68
 1797.15 WN= 51 KW=2.995 SW= .08
 231057.30 XN= 13 KX=3.682 SX= .18
 BOEING

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
260 6008 25-36378-001 BASE HEAT DEFLECTOR AW= 15.55 (KS)W= .58 AX=192.65 (KS)X=.56

W= 839.7C WSO=
 13059.33 WN= 54 KW=2.981 SW= .19
X= 6357.32 XSQ=
 1224713.67 XN= 33 KX=3.133 SX= .18

BOEING

57

W	6.10	X	79.20	W	6.42	X	.	W	6.15	X	.	W	6.32	X	.	W	6.55	X	79.20
	6.14	.	.		6.27	.	.		6.03	.	.		6.44	.	.		6.03	.	79.81
	5.98	78.96			6.13	79.70			6.29	.	.		6.09	.	.		6.18	.	.
	6.08	.	.		6.26	.	.		5.94	79.20			6.32	.	.		6.19	.	.
	6.10	.	.		5.80	.	.		6.16	.	.		6.24	.	.		6.20	.	.
	5.72	.	.		6.18	.	.		6.40	.	.		6.30	.	.		5.73	.	.
	6.28	.	.		6.27	.	.		6.35	.	.		6.41	.	.		6.26	.	.
	6.33	.	.		6.42	.	.		6.32	.	.		6.71	.	.		6.15	.	.
	6.51	.	.		6.63	.	.		6.16	.	.		6.16	.	.		6.56	.	.
																	6.37	.	.

180 6005 25-34831-001 RACEWAY COVER
 W = 330.61 WSQ =
 X = 555.67 XSQ =
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AW = 6.24 (KS)W = .63 AX = 79.38 (KS)X = 1.44
 2064.65 WN = 53 KW = 2.985 SW = .21
 44110.49 XN = 7 KX = 4.521 SX = .32
 BOEING

BOEING D2-13956-2

W	6.51	133.50	X	6.31	134.00	W	6.22	X	6.28	W	6.52	X	6.52
6.36	6.41	6.17	6.57	6.50	6.75	6.81	6.72	6.58	6.46	6.55	6.51	6.55	6.55
6.53	6.63	6.62	6.55	6.80	6.44	6.55	6.45	6.58	6.70	6.68	6.67	6.67	6.68
6.47	6.62	6.72	6.80	6.44	6.55	6.47	6.62	6.59	6.66	6.68	6.88	6.88	6.88
6.66	6.35	6.61	6.58	6.64	6.68	6.59	6.56	6.37	6.68	6.67	6.67	6.67	6.67
6.69	6.61	6.62	6.58	6.64	6.68	6.59	6.56	6.37	6.68	6.67	6.67	6.67	6.67
6.69	6.61	6.62	6.58	6.64	6.68	6.59	6.56	6.37	6.68	6.67	6.67	6.67	6.67
6.59	6.62	6.46	6.64	6.68	6.55	6.59	6.56	6.37	6.68	6.67	6.67	6.67	6.67
6.57	6.67	6.67	6.68	6.55	6.59	6.56	6.37	6.37	6.68	6.67	6.67	6.67	6.67
6.57	6.67	6.67	6.68	6.55	6.59	6.56	6.37	6.37	6.68	6.67	6.67	6.67	6.67
6.55	6.53	6.53	6.58	6.55	6.59	6.56	6.37	6.37	6.68	6.67	6.67	6.67	6.67

180 6005 25-34831-002 RACEWAY COVER
 W= 465.27 WSQ= 3050.32 WN= 71 KW=2.917 SW= .14
 X= 668.94 XSQ= 89496.36 XN= 5 KX=5.423 SX= .23
 BOEING

W	6.69	188.85	X	188.20	W	6.69	188.20	X	188.20
	6.82	188.25				6.79			
	6.87	188.27				6.74			
	6.66					6.72			
	6.68					6.64			
	6.77					6.72			
	6.82					6.73			
	6.85								

W	6.61	188.83	X	188.10	W	6.52	X	
	6.60	188.16				6.57		
	6.77					6.82		
	6.76					6.62		
	6.73					6.83		
	6.62					6.74		
	6.80					6.85		

W	6.44	X		W	6.48	X	
	6.75	188.10			6.72	188.22	
	6.77				6.72		
	7.00				6.79		
	6.83				6.66		
	6.79				6.92		
	6.81				6.85		

180 6005 25-34831-003 RACEWAY COVER
 W= 289.56 WSQ=
 X= 1506.88 XSQ=
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AW= 6.73 (KS)W= .34 AX=188.36 (KS)X= 1.29
 1950.42 WN= 43 KW=3.044 SW= .11
 283836.55 XN= 8 KX=4.278 SX= .30
 BOEING

W	5.53	X	77.55	W	5.65	X	77.45	W	5.53	X	77.83	W	5.80	X	77.95	W	5.75	X	77.75
	5.79		77.80		5.89		.		5.76		.		5.83		.		5.48		5.73
	5.58		.		6.01		.		5.82		.		5.63		.		5.77		5.74
	5.75		.		5.64		.		5.65		.		5.76		.		5.84		5.73
	5.72		.		5.84		.		5.88		.		5.72		.		5.53		5.75
	5.75		.		5.87		.		5.81		.		5.77		.		5.82		5.69
	5.61		.		5.67		.		5.77		.		5.71		.		5.80		5.79
	5.70		.		5.63		.				.				.				

260 6005 25-34832-001 RACEWAY COVER
 W= 252.24 WSQ=
 X= 466.33 XSQ=
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AW= 5.73 (KS)W= .33 AX= 77.72 (KS)X= .91
 1446.52 WN= 44 KW=3.037 SW= .11
 36244.12 XN= 6 KX=4.870 SX= .19
 BOEING

BOEING D2-13956-2

W	5.99	X	130.20	W	5.89	X	130.35	W	5.82	X	130.35	W	5.97	X	130.25	W	5.96	X	130.50	W	6.04	X	130.50
	5.99		130.95		6.02		.		6.19		.		6.07		.		6.00		.		6.04		130.35
	6.08		130.40		5.95		.		5.92		.		5.81		.		6.00		.		6.06		.
	5.94		.		5.98		.		6.02		.		6.00		.		6.01		.		6.17		.
	6.03		.		6.02		.		5.92		.		5.97		.		6.00		.		5.83		.
	5.88		.		6.21		.		6.05		.		5.96		.		6.07		.		6.06		.
	5.88		.		5.88		.		6.10		.		6.01		.		6.05		.		6.03		.
	6.07		.		5.99		.		6.10		.		6.05		.		6.07		.		6.06		.
	6.04		.		6.07		.		6.03		.		6.01		.		6.34		.		6.43		.
	5.87		.		6.22		.		6.05		.		5.97		.				.				.

260 6005 25-34832-002 RACEWAY COVER
 W= 349.24 WSQ=
 X= 1173.85 XSQ=
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AX= 6.02 (KS)W= .33 AX=130.43 (KS)X= .90
 2103.61 WN= 58 KW=2.963 SW= .11
 153103.03 XN= 9 KX=4.098 SX= .22
 BOEING

BOEING D2-13956-2

W	5.50	86.85	X	86.85	W	5.59	87.50	X	87.50	W	5.46	87.50	X	87.50	W	5.40	86.80	X	86.80	W	5.66	86.90	X	86.90	W	5.67	86.98	X	86.98
	5.65	86.85		86.85		5.67					5.58	86.70		86.70		5.66					5.78				5.77				
	5.72					5.80					5.54					5.57					5.51				5.61				
	5.65					5.69					5.77					5.65					5.72				5.74				
	5.61										5.72					5.63									5.73				
	5.75					5.81					5.68					5.68					5.64				5.75				
	5.72					5.68					5.71					5.64					5.68				5.86				
	5.80					5.77					5.91					5.80					5.70				5.68				
	5.73					5.71					5.66					5.71					5.65				5.66				
	5.80					5.75					5.64					5.66					5.65				5.63				
	5.66					5.66																							

340 6005 25-34833-001 RACEWAY COVER
 W = 340.88 WSQ =
 X = 783.08 XSQ =
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AW = 5.68 (KS)W = .27 AX = 87.01 (KS)X = 1.20
 1937.14 WN = 60 KW = 2.955 SW = .09
 68135.61 XN = 9 KX = 4.098 SX = .29
 BOEING

W	5.50	86.85	X	86.85	W	5.59	87.50	X	87.50	W	5.46	87.50	X	86.80	W	5.66	86.90	X	86.90	W	5.67	86.98	X	86.98
	5.65	86.85		86.85		5.67			86.70		5.58	86.70		87.00		5.78					5.77			
	5.72					5.80					5.54					5.51					5.61			
	5.65					5.69					5.77					5.72					5.74			
	5.61										5.72										5.73			
	5.75					5.81					5.68					5.64					5.75			
	5.72					5.68					5.71					5.68					5.86			
	5.80					5.77					5.91					5.70					5.68			
	5.73					5.71					5.66					5.65					5.66			
	5.80					5.75					5.64					5.65					5.63			
	5.66					5.66																		

340 6005 25-34833-001 RACEWAY COVER
 W= 340.88 WSQ=
 X= 783.08 XSQ=
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AW= 5.68 (KS)W= .27 AX= 87.01 (KS)X= 1.20
 1937.14 WN= 60 KW=2.955 SW= .09
 68135.61 XN= 9 KX=4.098 SX= .29
 BOEING

W	1.21	X	54.95	W	1.20	X	54.91	W	1.24	X	54.95	W	1.23	X	54.85
	1.26		54.94		1.30		.		1.25		.		1.31		54.85
	1.25		.		1.27		.		1.27		.		1.25		.
	1.29		.		1.22		.		1.26		.		1.27		.
	1.29		.		1.26		.		1.27		.		1.26		.
	1.25		.		1.25		.		1.23		.		1.24		.
	1.25		.		1.24		.		1.24		.		1.24		.
	1.30		.		1.28		.		1.26		.		1.24		.
	1.28		.		1.24		.		1.22		.		1.24		.
	1.23		.		1.23		.		1.22		.		1.27		.
	1.22		.		1.23		.		1.23		.		1.20		.
	1.22		.		1.23		.		1.25		.		1.24		.
	1.26		.		1.22		.				.				.

052 6005 25-36219-001 RACEWAY CAP
 W = 84.97 W SQ =
 X = 274.60 X SQ =
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AW = 1.25 (KS)W = .08 AX = 54.92 (KS)X = .23
 106.23 WN = 68 KW = 2.927 SW = .03
 15081.04 XN = 5 KX = 5.423 SX = .04
 BOEING

W	X	W	X	W	X	W	X	W	X	W	X	W	X
1.50	56.50	1.53	56.65	1.52	56.65	1.57	56.65	1.58	56.62	1.56	56.62	1.57	56.62
1.54	.	1.53	.	1.51	.	1.60	.	1.54	.	1.56	.	1.56	.
1.56	.	1.59	.	1.57	.	1.53	.	1.51	.	1.54	.	1.54	.
1.54	.	1.52	.	1.54	.	1.52	.	1.56	.	1.54	.	1.54	.
1.53	.	1.56	.	1.52	.	1.52	.	1.59	.	1.52	.	1.52	.
1.52	.	1.52	.	1.52	.	1.50	.	1.51	.	1.53	.	1.53	.
1.49	.	1.54	.	1.53	.	1.52	.	1.50	.	1.50	.	1.50	.
1.51	.	1.55	.	1.49	.	1.55	.	1.51	.	1.51	.	1.51	.
1.61	.	1.49	.	1.50	.	1.52	.	1.56	.	1.54	.	1.54	.

BOEING D2-13956-2

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 340 6005 25-36272-001 RACEWAY CAP
 W= 84.39 WSQ=
 X= 226.42 XSQ=
 AW= 1.53 (KS)W= .08 AX= 56.61 (KS)X= .46
 129.53 WN= 55 KW=2.976 SW= .03
 12816.52 XN= 4 KX=6.440 SX= .07
 BOEING

W	2.61	X	57.30	W	2.57	X	57.32	W	2.51	X	57.20	W	2.38	X	57.40	W	2.44	X	57.42	W	2.58	X	.
	2.62	.	.		2.59	.	57.05		2.58	.	.		2.43	.	.		2.50	.	.		2.50	.	.
	2.56	.	.		2.43	.	.		2.42	.	.		2.47	.	.		2.43	.	.		2.41	.	.
	2.41	.	.		2.38	.	.		2.45	.	.		2.39	.	.		2.50	.	.		2.57	.	.
	2.49	.	.		2.43	.	.		2.41	.	.		2.35	.	.		2.32	.	.		57.10	.	.
	2.39	.	.		2.37	.	.		2.42	.	.		2.47	.	.		2.37	.	.		2.47	.	.
	2.41	.	.		2.38	.	.		2.30	.	.		2.39	.	.		2.43	.	.		2.42	.	.
	2.42	.	.		2.32	.	.		2.37	.	.		2.33	.	.		2.39	.	.		2.35	.	.
	2.38	.	.		2.32	.	.		2.32	.	.		2.33	.	.		2.31	.	.		2.36	.	.
	2.35	.	.		2.31	.	.		2.34	.	.		2.36	.	.		2.33	.	.		2.30	.	.
	2.36	.	.		2.46	.	.		2.40	.	.		2.31	.	.		2.32	.	.		2.28	.	.
	2.82	.	.		2.59	.	.			.	.			.	.			.	.			.	.

190 6005 25-37043-001 RACEWAY CAP
 W= 164.68 WSQ=
 X= 400.79 XSQ=
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AM= 2.42 (KS)W= .29 AX= 57.26 (KS)X= .65
 399.48 WN= 68 KW=2.927 SW= .10
 22947.64 XN= 7 KX=4.521 SX= .14
 BOEING

W	1.07	X	83.40	W	1.01	X	83.25	W	1.05	X	83.30	W	1.07	X	83.34	W	1.09	X	83.37	W	1.07	X	83.37
1.07	83.25	1.10	.	1.08	.	1.07	.	1.07	.	1.07	.	1.07	.	1.09	.	1.10	.	1.08	.	1.12	.	1.12	.
1.13	.	1.11	.	1.07	.	1.09	.	1.07	.	1.09	.	1.09	.	1.13	.	1.10	.	1.15	.	1.11	.	1.11	.
1.06	.	1.10	.	1.08	.	1.08	.	1.08	.	1.09	.	1.10	.	1.10	.	1.07	.	1.10	.	1.11	.	1.05	.
1.16	.	1.12	.	1.09	.	1.21	.	1.09	.	1.09	.	1.07	.	1.07	.	1.10	.	1.07	.	1.07	.	1.07	.
1.10	.	1.08	.	1.05	.	1.10	.	1.05	.	1.10	.	1.09	.	1.09	.	1.08	.	1.08	.	1.08	.	1.08	.
1.08	.	1.09	.	1.10	.	1.06	.	1.10	.	1.06	.	1.07	.	1.07	.	1.06	.	1.06	.	1.07	.	1.07	.
1.09	.	1.09	.	1.05	.	1.10	.	1.08	.	1.08	.	1.06	.	1.06	.	1.08	.	1.05	.	1.08	.	1.08	.
1.08	.	1.05	.	1.10	.	1.07	.	1.07	.	1.07	.	1.07	.	1.07	.	1.04	.	1.04	.	1.08	.	1.08	.
1.07	.	1.12	.	1.07	.	1.10	.	1.07	.	1.11	.	1.11	.	1.11	.	1.11	.	1.11	.	1.11	.	1.11	.
1.06	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.
1.07	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.	1.06	.

053 6005 25-37231-001 RACEWAY CAP
 W= 82.46 WSQ=
 X= 499.91 XSQ=
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AW= 1.09 (KS)W= .08 AX= 83.32 (KS)X= .30
 89.53 WN= 76 KW=2.904 SW= .03
 41651.69 XN= 6 KX=4.870 SX= .06
 BOEING

W	X	W	X	W	X	W	X	W	X	W	X	W	X	W	X
.75	53.00	.74	52.95	.75	52.96	.73	53.08	.75	52.98	.77	53.00	.73	53.08	.75	52.98
.73	.	.79	.	.76	.	.77	.	.77	.	.77	.	.77	.	.77	.
.76	.	.77	.	.80	.	.72	.	.72	.	.72	.	.72	.	.75	.
.75	.	.73	.	.74	.	.74	.	.74	.	.74	.	.74	.	.75	.
.74	.	.74	.	.73	.	.73	.	.74	.	.74	.	.74	.	.79	.
.77	.	.74	.	.76	.	.73	.	.73	.	.73	.	.73	.	.73	.
.72	.	.74	.	.75	.	.75	.	.75	.	.75	.	.75	.	.75	.
.73	.	.75	.	.73	.	.73	.	.72	.	.72	.	.72	.	.72	.
.74	.	.73	.	.72	.	.72	.	.77	.	.77	.	.77	.	.74	.
.73	.	.75	.	.75	.	.75	.	.73	.	.73	.	.73	.	.72	.
.73	.	.73	.	.72	.	.72	.	.76	.	.76	.	.76	.	.75	.
.75	.	.75	.	.73	.	.73	.	.76	.	.76	.	.76	.	.75	.
.75	.	.74	.	.74	.	.74	.	.73	.	.73	.	.73	.	.73	.

072 6005 25-37232-001 RACEWAY CAP
 W= 54.40 WSQ= 317.97 XSQ= 16850.83 XN= 6 KX=4.870 SX= .05
 POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 AW= .75 (KS)W= .05 AX= 53.00 (KS)X= .122
 40.56 WN= 73 KW=2.912 SW= .102
 BOEING

W	W	W	W	W	W	W	W	W
.28	.31	.31	.31	.31	.31	.32	.33	.37

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 260 6005 25-27209-025 RACEWAY WIRE SUPPORT

$$\frac{W=2.85 \text{ WSQ}=}{.91 \text{ WN}=}$$

$$\frac{.32 \text{ (KS)W}= .10}{9 \text{ KW}=4.098 \text{ SW}= .02}$$

BOEING

BOEING D2-13956-2

W	W	W	W	W	W	W	W	W	W
.46	.50	.51	.52	.53	.53	.54	.54	.55	.55
.56	.57	.57	.58	.58	.59	.63			

BOEING

D2-13956-2

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 260 6005 25-27209-026 RACEWAY WIRE SUPPORT
 $W = \frac{9.31}{WSQ} = 5.12$ $WN = 17$ $KW = 3.471$ $SW = .04$
 $AM = .55$ $(KS)W = .13$

BOEING

W	W	W	W	W	W	W	W	W	W
.46	.50	.51	.52	.53	.53	.54	.54	.55	.55
.56	.57	.57	.58	.58	.59	.63			

BOEING

D2-13956-2

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 260 6005 25-27209-026 RACEWAY WIRE SUPPORT AW= .55 (KS)W= .13
 W= 9.31 WSQ= 5.12 WN= 17 KW=3.471 SW= .04

BOEING

W	W	W	W	W	W	W	W	W	W	W
.29	.29	.30	.31	.31	.32	.32	.32	.32	.33	.33
.34	.35									

BOEING

D2-13956-2

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 260 6005 25-27209-027 RACEWAY WIRE SUPPORT AW= .32 (KS)W= .07
 W= 3.81 WSQ= 1.21 WN= 12 KW=3.758 SW= .02

BOEING

W	W	W	W	W	W	W	W	W	W
1.19	1.19	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.22
1.22	1.22	1.22	1.22	1.23	1.23	1.24	1.24	1.24	1.25
1.25	1.26	1.27	1.32						

BOEING D2-13956-2

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 180 6005 25-35471-001 RACEWAY WIRE SUPPORT
 $W = \frac{325.75}{361.96} WSQ =$ $AW = \frac{1.11}{294} (KS)W =$ $.16$
 $WN = 2.727$ $SW = .06$

BOEING

W	W	W	W	W	W	W	W	W	W	W	W	W
1.07	1.09	1.11	1.11	1.15	1.15	1.16	1.16	1.16	1.17	1.17	1.17	1.17
1.17	1.17	1.17	1.18	1.19	1.19	1.21	1.21	1.21	1.22	1.22	1.22	1.22
1.24	1.24	1.24	1.25	1.25	1.25	1.26	1.26	1.27	1.27	1.27	1.27	1.27
1.28	1.28	1.28	1.29	1.29	1.30	1.30	1.30	1.32	1.34	1.34	1.34	1.34

BOEING

D2-13956-2

POPULATION 99 PER CENT CONFIDENCE LEVEL 90 PER CENT
 180 6005 25-35769-002 RACEWAY WIRE SUPPORT
 W= 47.50 WSQ= 58.02 WN= 39 KW=3.075 SW= .07
 AW= 1.22 (KS)W= .20

BOEING

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6009	BMS 5-62 44	0.94	1.06	306.65	18.77	108.24	2.12	115.20	8.29			
6009	BMS 5-62 45-1	0.77	1.22	329.99	8.96	109.22	1.45	110.86	3.24			
6009	BMS 5-62 45-2	1.99	0.80	329.37	2.05	99.30	5.24	106.48	6.34			
6009	BMS 5-62 45-3	0.42	0.54	349.43	6.24	105.34	11.44	108.78	20.76			
6009	BMS 5-62 46	2.34	1.75	425.84	13.35	109.92	1.93	117.76	3.98			
6009	BMS 5-62 47-1	0.83	0.75	477.22	5.61	109.10	1.01	111.52	0.89			
6009	BMS 5-62 47-2	1.53	1.61	485.20	4.84	96.26	9.08	111.90	6.10			
6009	BMS 5-62 47-3	0.79	1.66	513.12	23.18	109.16	19.14	113.52	38.72			
6009	BMS 5-62 48	2.77	2.26	669.64	63.42	112.50	7.42	121.76	12.92			
6009	BMS 5-62 49	2.06	1.37	761.40	14.50	106.46	13.09	108.98	13.41			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.335235E 05	0.172934E 04	0.345614E 04	0.398402E 06	0.556269E 03	0.489451E 03
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
12.680	2.880	4.071	43.711	1.633	1.532

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
BMS 5-62	14.44	4.42	506.11	56.39	106.64	4.51	113.71	5.60			

WEIGHT AND BALANCE

INPUT

MRCN	DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
6009	ATTACH 42	1.02	0.	259.62	0.	100.00	0.	100.00	0.			
6009	ATTACH 44	1.83	0.	285.86	0.	102.18	0.	105.20	0.			
6009	ATTACH 45-1	2.13	0.	320.87	0.	101.99	0.	102.00	0.			
6009	ATTACH 45-2	0.09	0.	323.66	0.	109.20	0.	116.00	0.			
6009	ATTACH 45-3	1.87	0.	355.56	0.	100.28	0.	102.62	0.			
6009	ATTACH 46	0.72	0.	400.56	0.	108.50	0.	115.37	0.			
6009	ATTACH 47-1	1.62	0.	492.91	0.	104.16	0.	103.94	0.			
6009	ATTACH 47-2	0.09	0.	470.02	0.	110.20	0.	119.50	0.			
6009	ATTACH 47-3	1.78	0.	500.20	0.	99.95	0.	103.71	0.			
6009	ATTACH 48	1.32	0.	646.72	0.	114.24	0.	116.95	0.			
6009	ATTACH 49	2.18	0.	754.29	0.	106.29	0.	106.04	0.			

SUMMARY

W DELTA X	W DELTA Y	W DELTA Z	DELTA W X	DELTA W Y	DELTA W Z
0.	0.	0.	0.	0.	0.
WDX/W	WDY/W	WDZ/W	DWDX/W	DWDY/W	DWDZ/W
0.	0.	0.	0.	0.	0.

TOTALS

DESCRIPTION	WT	WT DISP	X	X DISP	Y	Y DISP	Z	Z DISP	IX	IY	IZ
ATTACHMENTS	14.65	0.	456.18	0.	103.81	0.	105.56	0.			

SECT	MRCN	POPULATION PART NO	99 PER CENT TITLE	CONFIDENCE LEVEL	90 PER CENT AVG	DISP
072	6010	25-27226-027	INSULATED GUIDE	AW=	.93 (KS)W=	.14
072	6010	25-37125-008	INSUL COVER	AW=	.09 (KS)W=	.00
072	6010	25-37125-009	INSUL COVER	AW=	.08 (KS)W=	.00
052	6010	25-37125-010	INSUL COVER	AW=	.07 (KS)W=	.00
052	6010	25-37125-012	INSUL COVER	AW=	.07 (KS)W=	.00
052	6010	25-37125-018	INSUL COVER	AW=	.14 (KS)W=	.00
072	6010	25-37125-019	INSUL COVER	AW=	.10 (KS)W=	.05
180	6010	25-37125-020	INSUL COVER	AW=	.13 (KS)W=	.00
180	6010	25-37125-021	INSUL COVER	AW=	.17 (KS)W=	.00
180	6010	25-37125-023	INSUL COVER	AW=	.15 (KS)W=	.00
180	6010	25-37125-024	INSUL COVER	AW=	.17 (KS)W=	.00

BOEING

SECT	MRCN	POPULATION	99 PER CENT	TITLE	CONFIDENCE LEVEL	90 PER CENT	DISP
		PART NO				AVG	
051	6011	25-28046-005	INSUL	CONN	AW=	.17 (KS)W=	.00
051	6011	25-28046-006	INSUL	CONN	AW=	.18 (KS)W=	.00
051	6011	25-28069-005	INSUL	CONN	AW=	.11 (KS)W=	.00
051	6011	25-28069-006	INSUL	CONN	AW=	.09 (KS)W=	.00
050	6011	25-28089-002	G+C	CABLE SUPT INSUL	AW=	.02 (KS)W=	.00
340	6011	25-29822-003	G+C	CABLE CONNECT BRKT	AW=	.46 (KS)W=	.08
340	6011	25-30927-003	THRUST	STRAP ASSY	AW=	1.10 (KS)W=	.08
070	6011	25-32271-013	ENTRY	CHUTE LWR	AW=	.40 (KS)W=	.09
070	6011	25-32271-015	ENTRY	CHUTE UPR	AW=	.32 (KS)W=	.07
050	6011	25-32429-001	UPPER	CHUTE	AW=	.71 (KS)W=	.11
050	6011	25-32429-002	LOWER	CHUTE	AW=	.58 (KS)W=	.12
050	6011	25-32430-001	ENTRY	CHUTE INSUL	AW=	.04 (KS)W=	.00
050	6011	25-32430-002	ENTRY	CHUTE INSUL	AW=	.03 (KS)W=	.00
050	6011	25-32430-003	ENTRY	CHUTE INSUL	AW=	.07 (KS)W=	.06
050	6011	25-32430-004	ENTRY	CHUTE INSUL	AW=	.03 (KS)W=	.05
050	6011	25-32430-005	ENTRY	CHUTE INSUL	AW=	.01 (KS)W=	.00
050	6011	25-32430-006	ENTRY	CHUTE INSUL	AW=	.01 (KS)W=	.00
190	6011	25-36627-007	SUPPT	INSUL	AW=	.04 (KS)W=	.00
050	6011	26-10923-002	G+C	STRUCT SUPT SPACER	AW=	.03 (KS)W=	.00
050	6011	26-12066-001	ENTRY	CHUTE SEAL INSUL	AW=	.01 (KS)W=	.00
050	6011	26-12066-002	ENTRY	CHUTE SEAL INSUL	AW=	.02 (KS)W=	.00
071	6011	26-12078-003	INSUL	CLAMP	AW=	.05 (KS)W=	.00
051	6011	26-12435-002	INSUL	JUMPER	AW=	.11 (KS)W=	.04
051	6011	26-12454-002	INSUL	JUMPER	AW=	.03 (KS)W=	.00
050	6011	26-12467-001	G+C	CHUTE SPACER INSUL	AW=	.02 (KS)W=	.00
050	6011	26-12467-003	G+C	CHUTE SPACER INSUL	AW=	.04 (KS)W=	.04

BOEING

SECT	MRCN	POPULATION PART NO	99 PER CENT TITLE	CONFIDENCE LEVEL	90 PER CENT AVG	DISP
050	6011	26-12541-002	CHUTE ATTACH PLATE	AW=	.02 (KS)W=	.00
340	6011	26-13079-001	THRUST STRAP WASHER	AW=	.00 (KS)W=	.00
340	6011	26-13080-001	CABLE THRUST TERM CLAMP	AW=	.02 (KS)W=	.00
340	6011	26-13082-002	THRUST FITTING KEY	AW=	.00 (KS)W=	.00
340	6011	26-15632-004	CONNECTOR BOOT	AW=	.12 (KS)W=	.00
050	6011	26-15734-001	THRUST FITTING SHIM	AW=	.01 (KS)W=	.00
050	6011	29-21853-002	ENTRY CHUTE BRKT INSUL	AW=	.13 (KS)W=	.00
050	6011	29-21875-002	2-3 CHUTE ATTACH YOKE	AW=	.17 (KS)W=	.05
180	6011	29-22298-002	THRUST FITTING	AW=	.61 (KS)W=	.00
340	6011	29-23395-003	STATIC GROUND JUMPER	AW=	.18 (KS)W=	.00
340	6011	29-23395-005	STATIC GROUND JUMPER	AW=	.04 (KS)W=	.00
340	6011	29-23398-004	CLAMP FITTING ASSY	AW=	.03 (KS)W=	.00
050	6011	29-24425-008	ENTRY CHUTE SEAL	AW=	.15 (KS)W=	.00
070	6011	29-24685-001	G+C CLAMP	AW=	.09 (KS)W=	.00
070	6011	29-25299-004	BOLT INSUL	AW=	.02 (KS)W=	.00
071	6011	29-25299-007	INSUL SEAL	AW=	.01 (KS)W=	.00
071	6011	29-25299-008	INSUL SEAL	AW=	.21 (KS)W=	.00
071	6011	29-25299-009	INSUL SEAL	AW=	.39 (KS)W=	.05
340	6011	29-25779-004	INSUL SEAL	AW=	.11 (KS)W=	.00
340	6011	29-25779-005	INSUL SEAL	AW=	.13 (KS)W=	.00
190	6011	29-28031-005	CABLE CLAMP	AW=	.07 (KS)W=	.00
190	6011	29-29073-001	CABLE CLAMP	AW=	.07 (KS)W=	.00
190	6011	29-29377-001	CABLE INSUL	AW=	.27 (KS)W=	.00

BOEING

SECT	MRCN	POPULATION PART NO	99 PER CENT TITLE	CONFIDENCE LEVEL	90 PER CENT AVG	DISP
053	6020	10-20436-005	ARM-DISARM MECHANISM	AW=	2.84 (KS)W=	.05

BOEING

BOEING D2-13956-2

SECT	MRCN	POPULATION	99 PER CENT	CONFIDENCE LEVEL	90 PER CENT	DISP
	PART NO	TITLE	AVG			
053	6503	10-20451-001 LINEAR EXPLOSIVE	AW=	1.13 (KS)W=	.06	
052	6503	10-20451-003 LINEAR EXPLOSIVE	AW=	1.28 (KS)W=	.06	
053	6503	10-20451-005 DETONATOR ASSY	AW=	.08 (KS)W=	.00	
052	6503	10-20870-018 BOOSTER EXPLOSIVE	AW=	.34 (KS)W=	.00	
052	6503	10-20870-021 LINEAR EXPLOSIVE	AW=	.20 (KS)W=	.00	
052	6503	10-20870-030 TIME DELAY BOOSTER	AW=	.16 (KS)W=	.00	
052	6503	25-25218-015 S+A MECH ASSY	AW=	.61 (KS)W=	.00	

BOEING

SECT	MRCN	POPULATION	99 PER CENT	CONFIDENCE LEVEL	90 PER CENT	DISP
		PART NO	TITLE		AVG	
051	6507	25-27227-002	INSULATION MOLDED	AW=	.10 (KS)W=	.00
051	6507	25-27227-003	INSULATION MOLDED	AW=	.03 (KS)W=	.03
051	6507	25-27227-004	INSULATION MOLDED	AW=	.03 (KS)W=	.00
051	6507	25-27227-005	INSULATION MOLDED	AW=	.16 (KS)W=	.03
051	6507	25-27228-001	STRUT INSULATED	AW=	1.20 (KS)W=	.26
051	6507	25-27230-005	FRAME INSULATED	AW=	3.46 (KS)W=	.40
052	6507	25-27232-022	GUIDE	AW=	.54 (KS)W=	.09
052	6507	25-27232-023	GUIDE	AW=	.51 (KS)W=	.12

BOEING

SECT	MRCN	POPULATION	99 PER CENT	CONFIDENCE LEVEL	90 PER CENT	DISP
		PART NO	TITLE		AVG	
073	6703	10-20451-002	LINEAR EXPLOSIVE	AW=	1.47 (KS)W=	.05
072	6703	10-20451-004	LINEAR EXPLOSIVE	AW=	1.63 (KS)W=	.07
073	6703	10-20451-005	DETONATOR ASSY	AW=	.08 (KS)W=	.00
072	6703	10-20451-018	BOOSTER EXPLOSIVE	AW=	.34 (KS)W=	.00
072	6703	10-20870-020	LINEAR EXPLOSIVE	AW=	.29 (KS)W=	.00
072	6703	10-20870-026	TIME DELAY BOOSTER	AW=	.33 (KS)W=	.04
072	6703	25-25218-016	S+A MECH ASSY	AW=	.70 (KS)W=	.00

BOEING

SECT	MRCN	POPULATION	99 PER CENT	CONFIDENCE LEVEL	90 PER CENT	DISP
	PART NO	TITLE		AVG		
071	6706	25-27221-002	INSUL MOLDED	AW=	.06 (KS)W=	.03
071	6706	25-27221-003	INSUL MOLDED	AW=	.03 (KS)W=	.00
071	6706	25-27221-004	INSUL MOLDED	AW=	.03 (KS)W=	.00
071	6706	25-27221-005	INSUL MOLDED	AW=	.15 (KS)W=	.00
071	6706	25-27222-005	FRAME INSUL	AW=	6.45 (KS)W=	1.23
071	6706	25-27224-001	STRUT INSULATED	AW=	1.45 (KS)W=	.47
071	6706	25-27226-019	GUIDE	AW=	.95 (KS)W=	.16
072	6706	25-27226-027	GUIDE	AW=	.93 (KS)W=	.14

BOEING